This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

Medical Practitioner's
Library

LANE MEDICAL LIBRARY STANFORD
LB16 .M43 1894 STOR
Treatment of the diseases of the stomach
24503342294

Diseases of the Stomach and Intestines

Methieu

LANE

MEDICAL

LIBRARY

LEVI COOPER LANE FUND

Cost $2
Price 1.50

C E Lockwood
Nov 1 1895

TREATMENT

OF THE

DISEASES OF THE STOMACH

AND

INTESTINES

BY

DR. ALBERT MATHIEU

PHYSICIAN TO THE PARIS HOSPITALS

NEW YORK
WILLIAM WOOD & COMPANY
1894

COPYRIGHT, 1894,
BY WILLIAM WOOD & COMPANY

ELECTROTYPED AND PRINTED BY
THE PUBLISHERS' PRINTING COMPANY
132-136 WEST 14TH STREET
NEW YORK

W43
1894

PREFACE.

THIS volume contains a general summary of the therapeutics of diseases of the stomach and intestine. It is impossible to separate the study of the affections of these two portions of the digestive apparatus, especially as regards general pathology and dyspepsia, and the question of treatment is hardly more easily divided. The pyloric and ileo-cæcal valves are anatomical boundary lines much more than they are barriers in the domain of normal and morbid physiology.

Two facts brought forward in recent years have changed very considerably our views concerning gastro-intestinal pathology; these are the advances made in the chemistry of the stomach and the demonstration of the pathogenic importance of intoxications of intestinal origin. Our aim has been to show clearly in what measure these new ideas have modified the indications for treatment, to set forth the objects which the therapeutist has to propose to himself, and to indicate the means at his disposition for fulfilling them.

We must not forget that the last word is far from having been said; and if we are better acquainted, though still very incompletely, with the processes of gastric digestion, those of intestinal digestion are yet but imperfectly known. However, a gleam of light has now begun to

penetrate where once reigned the obscurity of pure empiricism; and that is something!

A few words may be said concerning the division of the subject adopted in this book. There is first a chapter on semeiological technique, in which we have described the principal methods employed for the examination of the contents of the stomach, of the fæces, and of the urine, with a view especially to the diagnosis of dyspeptic conditions. We have limited ourselves to an exposition of the simple elementary details which are indispensable to a good clinical examination. This is not because the physician always ought to or can make researches of this kind; but it is by means of them that we have gained what additional knowledge we now possess of the nature of dyspepsia, and one should be able to carry them out, since they alone give us certain information as to the chemical variety of gastric dyspepsia with which we have to deal.

In the second part will be found a general study, necessarily brief, of the diet suitable in case of gastro-intestinal dyspepsia.

The following part, the most important, is a manual of general, symptomatic therapeutics. Gastro-intestinal dyspepsia being really but a series of symptomatic complexes, its treatment is considered in this place. The reader will find arranged in a logical and natural order the clinical definition and treatment of the different dyspeptic states of the stomach and intestine, viz., hyperchlorhydria, atonic nervo-motor dyspepsia, dilatation of the stomach, constipation, diarrhœa, and auto-intoxication of gastro-intestinal origin. The indications furnished by the great dyspeptic complexes are in reality independent of the existence of the underlying pathological conditions, although the lesions, when they exist, may also themselves present

special therapeutical indications. There will be found therefore in this part of the work directions applicable to the treatment of the *diseases* of the stomach and intestines, considered by themselves, and more particularly to the treatment of the clinical forms of dyspepsia which are named according to the predominance of one or another symptomatic element.

In the last part we treat of the therapeutics of diseases of the stomach and intestine. This section is very short because the treatment of these diseases is above all symptomatic and the reader will find that many of the more useful indications have been given in the preceding part.

We have been obliged necessarily to preface the therapeutical portion with some general pathological considerations, but owing to want of space we have had to make this part very brief. We have elsewhere exposed at greater length the reasons for our views, somewhat eclectic it is true, of the nature of the primary and secondary dyspeptic states, and to these previous writings we must refer the reader.[1]

[1] "Traité de Médecine," vol. iii. Société Médicale des Hôpitaux, 1891-92. Article on Neurasthenia in the Bibliothèque Charcot-Debove.

CONTENTS.

PART I.

PAGE

DIAGNOSTIC TECHNIQUE, ... 1

PART II.

GENERAL CONSIDERATIONS ON DIET, ... 38

PART III.

TREATMENT OF THE PRINCIPAL CLINICAL FORMS OF DYSPEPSIA AND OF THE MOST COMMON SYMPTOMS OF GASTRO-INTESTINAL DISEASES, ... 62

CHAPTER I.

Hyperchlorhydria, ... 66

CHAPTER II.

Nervo-Motor Dyspepsia (Atonic or Asthenic Dyspepsia), . 88

CHAPTER III.

Dilatation of the Stomach with Permanent Stasis, . . . 128

CHAPTER IV.

Treatment of the Painful Phenomena in Diseases of the Stomach and Intestine.—Treatment of the Gastric and Intestinal Crises, ... 142

CHAPTER V.

Vomiting, ... 157

CHAPTER VI.

Disorders of the Appetite, ... 159

CHAPTER VII.

Constipation, ... 161

CHAPTER VIII.

PAGE

Diarrhœa, ... 192

CHAPTER IX.

Gastro-Intestinal Antisepsis, ... 207

CHAPTER X.

Dyspepsia—Acute Indigestion, ... 221

CHAPTER XI.

Gastric and Intestinal Hemorrhage, ... 226

PART IV.

Diseases of the Stomach and Intestine, . . . 228

CHAPTER I.

Gastritis, ... 229

CHAPTER II.

Simple Ulcer and Ulcerative Gastritis, ... 234

CHAPTER III.

Cancer of the Stomach, ... 243

CHAPTER IV.

Enteritis, ... 248

CHAPTER V.

Dysentery, ... 251

CHAPTER VI.

Typhlitis, Perityphlitis, Appendicitis, ... 254

CHAPTER VII.

Intestinal Occlusion, ... 259

CHAPTER VIII.

Cancer of the Intestine, ... 265

CHAPTER IX.

Intestinal Parasites, ... 267

Appendix, ... 275

TREATMENT OF THE DISEASES

OF THE

STOMACH AND INTESTINE.

PART I.

DIAGNOSTIC TECHNIQUE.

It is very necessary in the beginning of a work of this kind to present a summary at once brief and methodical of the technique to be followed in the semeiological examination of the digestive tube and of its functional action. Real progress has been made in this direction of recent years, and although what we yet know is but little in comparison with what we do not know, and although the advances thus far made have to do chiefly with the stomach, it is nevertheless certain that we have acquired new facts of undoubted value bearing upon a study of the varieties of dyspepsia and upon the question of its treatment. At the present day indeed it is impossible to understand the nature of, or to diagnosticate, dyspepsia and its clinical varieties without a practical knowledge of these new methods of examination.

We cannot here pass in review and criticise in detail the different methods of chemical examination of the gastric juice which have been proposed by various authors, and we must content ourselves with reviewing as clearly and as briefly as possible those methods which are of the most importance, and especially those which may prove

the most useful from a clinical point of view. We shall dwell especially upon the description of those procedures which a personal experience of many years has shown us to be really useful.

This diagnostic study naturally falls under the following heads:

1. External Examination.

2. Internal Examination, together with a Chemical Study of the Gastric Juice.

3. Study of the Excreta.

1. EXTERNAL EXAMINATION.—We shall consider very briefly the question of external examination, desiring only to call special attention to a few important points.

Simple *inspection* of the abdomen may afford information of a certain value. We can by this means recognize the amount, more or less marked, of meteorism and its location. Meteorism may be most apparent in the region of the stomach or it may involve uniformly the entire abdomen. As is well known, when an obstruction exists in the lower part of the small intestine, tympanites is present in the median portion of the abdomen, which then becomes most prominent. Sometimes the exaggerated contractions of the stomach or of the intestines may be observed through the thin and distended abdominal walls, and this is a symptom upon which Kussmaul has particularly insisted. These excessive contractions may be purely nervous or they may be a sign of the effort which the digestive tube is making to overcome an obstacle, such as a narrowing of the calibre of the intestine or a contraction of the pylorus.

Simple inspection will, again, afford information as regards the greater or less degree of relaxation of the abdominal walls. When these are relaxed and flaccid, the belly flattens out, as it were, laterally, as the patient lies on his back; when he stands up, on the other hand, it falls downward and forward, like a loose, half-filled sack. This is seen especially in persons who have been corpulent but who have lost a great deal of flesh, and in women after repeated confinements. It is the chief symptom of enter-

optosis, concerning which so much discussion has taken place since the publications of F. Glénard. This falling down of the abdomen has a real value in the special conditions which we have just specified; it furnishes an indication for the wearing of an abdominal belt, the support from which, without sufficing to cure, is nevertheless of great service to this class of patients.

Palpation, percussion, and succussion afford information of the greatest importance with regard to diagnosis.

By means of *palpation* we obtain information concerning the nature of tumors, whether true or false, and may also detect the presence of scybalous masses, so often mistaken for neoplasms in constipated persons and more particularly in the aged. By means of it also we examine for œdematous infiltrations, tumefactions, and painful points. Chapowsky has recommended in difficult cases that palpation of the abdomen be made while the patient lies in a warm bath; in this way we obtain a relaxation of the abdominal muscles, which greatly facilitates the examination.[1]

We ought to examine systematically for movable or actually floating kidney in all cases of nervous dyspepsia, especially when occurring in women; this condition of the kidney is found much more frequently on the right side than on the left.

We shall have to devote a little more time to a consideration of *percussion*, the practice of which requires the observance of certain special precautions when we have to do with the study of gastro-intestinal dyspepsia.

First, as to percussion of the stomach, which is to be made in the following way: the patient being on his back with the belly uncovered and the abdominal walls in a state of as complete relaxation as possible, percussion is made from above downward, following the mammary line from the lungs toward the stomach. In this way it is easy to map out the upper border of the stomach. As Malibran very justly observes, this border is often abnor-

[1] Wiener Medizinische Wochenschrift, No. 22, 1891.

mally elevated in gastro-intestinal atony and in flatulent dyspepsia. In percussing the semilunar space the resonance peculiar to the stomach in individual cases should be specially noted. The quality and tone of this resonance will give us often a very clear notion of the capacity and of the degree of distention of the stomach. In order to determine the lower border of this viscus it is necessary to percuss in the opposite direction from the side, or even from the iliac fossa, toward the stomach. Bearing in mind the peculiar resonance of the stomach, it is sometimes easy to make out clearly the exact point where the intestinal resonance ceases and the gastric begins. In order to facilitate this examination we may distend the stomach by introducing first some bicarbonate of soda and then a solution of tartaric acid, or by insufflating air. This method of examination has found special favor in Germany.

While conducting this examination we note the resonance of the colon and also, by means of palpation and of succussion, determine the condition of this tube.

Percussion is not always sufficient to enable us to map out the lower border of the stomach, and we must then resort to succussion to determine its location.

Succussion.—We have to distinguish two forms of succussion of the stomach, viz., digital and total, the latter of which may be called by way of distinction Hippocratic succussion of the stomach.

The method of digital succussion has acquired considerable importance since the publication of the works of Bouchard and of his disciples on the subject of dilatation of the stomach. It is made in the following way: the patient lying on his back with the abdominal muscles relaxed, a series of rapid taps with the extremities of the fingers is made on the abdominal wall along a line running from the umbilicus to the edge of the false ribs on the left side. When a certain amount of liquid and of gas is present in the stomach we obtain in this way a sensation of splashing, to the existence and location of which Bouchard

attributes a pathological signification of great importance. When this sign is obtained a long time after a meal and especially in the morning, when the patient is fasting, it is an evidence that the stomach is not completely empty, but that it contains stagnant fluids which may become the seat of abnormal fermentation. This fermentation may give rise to the formation of toxic substances which in turn may be the cause of a chronic auto-intoxication, and of a sort of acquired diathesis which betrays itself by a great variety of morbid symptoms.

The presence of a gastric succussion sound, when it is perceived below a line extending from the umbilicus to the border of the false ribs on the left side, indicates a permanent dilatation of the stomach. This sign is of special importance only when it is obtained a long time after a meal, and especially when the patient is fasting in the morning, no liquid having been taken at the moment of the examination. The corner-stone of the doctrine of gastric auto-intoxication is indeed permanent stasis of liquid in the stomach, and this stasis is shown to exist only when actual stagnation of the gastric fluids during fasting can be demonstrated (Debove).

We must not confound splashing in the colon with that which occurs in the stomach, a mistake which has sometimes been made. This confusion of the intestinal with the gastric noises explains doubtless those cases in which the passage of a tube and lavage of the stomach have failed to show the presence of fluid, although a splashing sound had been elicited by digital succussion.

Hippocratic succussion, in our opinion, affords information of a more reliable character. It gives rise to a wave sound, the gastric or intestinal origin of which is easily distinguished by its character; its character and tone also enable us to judge of the dimensions of the cavity in which the wave is produced.

If we base our diagnosis of dilatation of the stomach with permanent stasis upon an examination made only in the morning and when the patient is fasting, and especially

if we control the results of this examination by lavage of the stomach, we shall remarkably lessen the number of cases of true dilatation of this organ met with in practice. Dilatation with permanent stasis is moreover not a pathological entity; it is a common termination of different morbid conditions. The most opposite chemical processes may be found associated with it—hyperacidity, as well as a diminished production of hydrochloric acid.

Examination of the large intestine is made in a general way on the same lines as examination of the stomach, and, *mutatis mutandis*, what has been said of the latter will apply equally to the former.

In order to facilitate exploration of the colon, and to map out its borders, we may distend it by gas. Von Ziemssen, who was the first to advise this procedure, introduces into the rectum first a solution of bicarbonate of soda, and then one of tartaric acid. But it is simpler to introduce directly either carbonic acid gas already prepared, or air. The use of carbonic acid is preferred by some, for the reason that the irritation to the mucous membrane which this gas causes brings about a closure of the ileo-cæcal valve, while air would enter the small intestine and distend its lower portion.

In any case, before insufflation of the colon it is necessary to empty it by means of an evacuating enema. After this a red rubber catheter or stomach tube is introduced as far as possible into the rectum. The free extremity of this is attached to an insufflating apparatus, to an inverted siphon of Seltzer water, or to a cylinder containing liquid carbonic acid. The insufflation should be made slowly so as to produce a gradual dilatation, avoiding any sudden and exaggerated distention.

The advantage of this method is that it allows us better to map out the limits of the colon, to differentiate it from the stomach, to determine with greater ease what its relations may be with any abdominal tumor present, and also to determine whether it is the seat of a constriction. This

method is rarely used in France at the present day, by reason, no doubt, of its possible dangers.

Simon has recommended injection of water by the rectum as a method of diagnosis. When the patient is in the genu-pectoral position it is possible in the normal condition to inject from two to five quarts of water through a high rectal tube; but in cases of narrowing of the lower part of the large intestine the quantity of water which can be introduced is much less.

In order to judge better of the situation of certain abdominal tumors, Minkowski has recommended that the colon be filled with water and the stomach with gas. In this way we create two important landmarks for diagnostic purposes.

II. INTERNAL EXAMINATION TOGETHER WITH THE CHEMICAL STUDY OF GASTRIC DIGESTION.[1]—The internal examination of the stomach is made by means of the elastic siphon, the employment of Kussmaul's pump having been entirely abandoned. This is the method of examination devised by Leube. It teaches us the process by which the food is evacuated from the organ after a meal; it also enables us to withdraw fluid from the stomach during digestion and to study it chemically. This study of the chemistry of the stomach, which was first undertaken in Germany several years ago, has been made the subject of numerous treatises, and is still much discussed. After a purely qualitative study of the gastric juice had been pursued for some time, various methods of quantitative examination were proposed. The best of these is that employed by Hayem and Winter. We are the more ready to accord this deserved praise because we shall be obliged later to discuss and reject a certain number of their conclusions. Unfortunately the clinical study of the chemical changes occurring in intestinal digestion has not pro-

[1] It has been proposed by several writers to illuminate the cavity of the stomach by electricity, and to examine it either by transparency or by means of a tube provided with reflectors. (Reichmann, Therapeutische Monatshefte, March, 1892.)

gressed as far as has that relating to the stomach. From this it follows that we still know but little of the conditions of intestinal digestion in various forms of dyspepsia, and, as the anomalies of gastric digestion are better understood, there is a tendency to attach an exaggerated importance to them. Against this tendency it is necessary to be on our guard.

It is unfortunately hardly to be expected that we can add much in the near future to our knowledge of the digestive processes taking place in the intestine in the various forms of dyspepsia, by reason of the difficulties which a

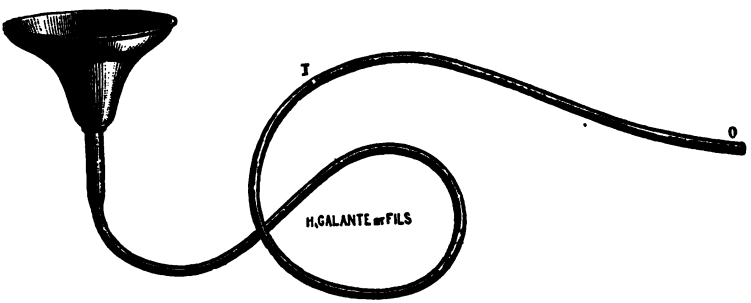


FIG. 1.—Debove's Tube.

study of this kind presents. Since it is impossible to analyze the contents of the intestine in various morbid conditions, as we can those of the stomach, our only way is to analyze foods as they are ingested, to study the chemistry of the stomach, and then to determine the amount of the various excreta. In this study the methodical analysis of the fæces would be of the first importance. Unfortunately investigations of this nature demand not only the consumption of much time and the possession of complicated laboratory apparatus, but also a knowledge of practical chemistry which it is hardly in the power of ordinary physicians to possess.

We are therefore forced to rely in our study of intestinal dyspepsia upon a few bald facts, as for example the existence of diarrhœa or of constipation, of tympanism, or

of pain. This is little enough, but nevertheless considerable progress has been made of recent years in our knowledge of the primary and secondary forms of gastro-intestinal dyspepsia.

But to return to the internal examination of the stomach by means of the elastic siphon, the method of practising which we shall examine in some detail. The passage of the sound is indeed the principal operation in the giving

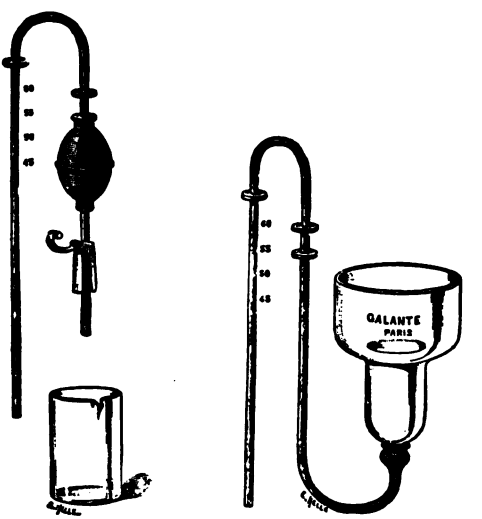


FIG. 2.—Frémont's Tube.

of a test meal, in washing out the stomach, and in forced feeding, all of which are of great importance in the diagnosis and treatment of diseases of this organ.

In the first place, what instrument shall we use? The red rubber tube, which Faucher was the first to use, and which Debove has since considerably improved, has wholly taken the place of the stomach pump.

Debove's tube is perfectly smooth and semi-rigid and it is more easily introduced than is Faucher's tube. But we prefer to either of them the tube devised by Frémont of Vichy, which is the one we ordinarily use.

Frémont's tube is smooth like that of Debove and a little

less rigid. It is, however, stiff enough to enable it to pass readily the isthmus of pharynx, even in patients who have never submitted to the operation before. It is longer than the other tubes, and this increases the aspiratory power of the descending branch of the siphon. A small glass tube is inserted in its course, which enables us to see whether the fluids to be passed into or withdrawn from the stomach flow readily. This is especially useful when gavage is practised. Finally the gastric extremity of Frémont's tube is provided with a wide opening so that it is less easily pinched by the walls of the stomach than are other tubes; and it is also more apt to remain patulous during the giving of a test meal. We think less of other modifications of the tube devised by Frémont. For example, we do not regard his funnel as especially convenient, and always employ a funnel of the ordinary shape. And again, we almost never use the aspirator, ingenious as it is, which he has attached to the siphon. We find expression sufficient for the extraction of the contents of the stomach. We shall see presently how this expression (Ewald's method) is carried out.

Our method of introducing the tube into the stomach is as follows: the patient sits upon a chair with a rubber cloth tied about his neck, to prevent any possible soiling of the clothing. The sound is introduced boldly to the fauces, after being dipped in a little cold water. It is not necessary to grease it. Sometimes it is of advantage to depress the base of the tongue with the index finger of the left hand, so as to prevent the sound from touching the soft palate or tickling the uvula. The extremity of the tube should strike first against the posterior wall of the pharynx in an oblique direction, from above downward and from before backward. It is easily passed down to the sphincter situated at the level of the cricoid cartilage. At this point a slight resistance is occasionally felt, which can be overcome by a little firmness without the employment of force. Indeed it is impossible, with a semi-flexible tube, like that of Frémont in particular, to use any undue

force. When this point has been passed the further progress of the tube is very easy and it may be passed into the stomach without meeting with any obstacle, unless indeed there should be present a stricture of the œsophagus. By means of the scale marked on the tube we are always able to tell at just what point its extremity lies.

It is well to give the patient certain instructions in advance. He must be told not to close his teeth and to let the saliva flow freely from the mouth and fall on the cloth which will protect his clothing. He must further be told, and this is a matter of great importance, to breathe freely, strongly, and even audibly. Certain patients, especially when the tube is passed for the first time, stop breathing and become red, congested, even purplish, so that the physician may be led to fear that he has passed the tube into the larynx. In such a case the patient should be commanded sternly to make a deep inspiration. When that is done the congestion of the face will be seen to disappear, and the physician may then be certain, if he had any doubts before, that the tube is really in the œsophagus. We never perform either lavage or gavage without having taken the precaution to make the patient breathe freely. This is the best means of overcoming the fright which the passage of the sound provokes, and to restore the confidence of the patient.

The introduction of the tube is made with a view of withdrawing the contents of the stomach by aspiration or expression, of washing out the stomach or of resorting to forced feeding.

Aspiration is seldom employed. It may be effected in one of several ways: by attaching the open end of the tube to a bottle from which the air is withdrawn very gradually, by means of a Potain aspirator; or by attaching the tube to the first of two communicating flasks, the second flask being filled with water and placed at a lower level than the first. Aspiration is effected by letting the water flow from the second flask. One may also make use of a special aspirating attachment devised by Frémont.

Usually, however, it is not necessary to resort to aspiration, the method of expression being sufficient to cause the withdrawal of the fluids of the stomach, and even, in some cases, to effect the complete evacuation of the organ. This method, called Ewald's expression, is performed in the following way: The sound being introduced, whether during fasting or after a test meal (see below), the patient is told to cough. He ought to cough especially with the diaphragm, in such a way as to cause a series of blows against the stomach. This suffices in most cases to fill the tube, and the gastric fluids then flow out on the principle of siphonage.

We should not forget that there is a general tendency to introduce the tube too far, and we may often obtain a flow of the fluid by withdrawing it a little. Sometimes by making successive to-and-fro movements of the tube we provoke efforts of vomiting, and, if the tube is not inserted too deeply, this expulsion of the contents of the stomach takes place through its lumen and the desired end is obtained. This is another reason why it is better to have a tube with a wide opening, provided not only with lateral eyes but also with a terminal opening of the diameter of the tube itself.

In practising lavage water is poured into the funnel and the latter is elevated so that the fluid flows into the stomach. Before the tube is completely emptied the funnel is rapidly lowered, in such a way that the tube is converted into a siphon and the water, more or less mixed with gastric juice and alimentary detritus, flows back through it. The same manœuvre is repeated several times until the lavage has been carried as far as necessary.

In case of forced feeding (gavage) it is necessary to proceed rapidly, to be sure that the patient is breathing well, and that all the liquid which has been poured into the funnel has been passed into the stomach. If this is not done there is danger that a part of the liquid may enter the larynx. In order that we may be sure that the tube is completely empty it is well to have it provided with a glass window as in Frémont's apparatus.

We insist upon all these details because upon a knowledge of them depends often the success of tubage of the stomach and of the operation which it is proposed to perform, whether exploration, the giving of a test meal, forced feeding, or lavage.

CHEMICAL EXAMINATION OF THE CONTENTS OF THE STOMACH.—The fluids withdrawn during fasting may be examined at once. But in most cases the stomach completes its task within six or eight hours after a normal meal (Leube), and after that time is entirely empty, so that, in order to obtain any fluid, the exploration must be made during digestion. The meal given with this special end is called a test meal. Leube gave a sort of test breakfast, similar to an ordinary breakfast, and examined the stomach from five to eight hours after this repast, with the object of determining how long it takes the organ to empty itself completely. This is one of the best means of judging concerning the degree of motility of the stomach.

When it is desired to make a chemical examination of the contents of the stomach a meal of this kind would be unsuitable, for digestion is at its height rather late, and furthermore the withdrawal of the fluids would often be rendered difficult by clogging of the tube with alimentary detritus. On this account a much more simple and less copious test meal is usually given. One of the most commonly employed is Ewald's, which consists of 60 grammes of stale bread and 250 grammes of weak tea or water. The contents of the stomach are then removed at the end of an hour, counting from the time the first mouthful is taken.

This meal is excellent when it is desired to study the condition of secretion of the gastric mucous membrane, or to procure some of the gastric juice with a view to its examination by Winter's methods or by artificial digestion in a test-tube. It is of much less value when it is a question of investigating and determining the importance of secondary acid fermentations. In such a case it would be better to make use of a more complicated meal containing eggs or meat. And then it will be necessary to delay the

moment of examination so that it may coincide with the period of maximum secretion and digestion.

How is the chemical examination of the contents of the stomach which have just been extracted to be made? We shall content ourselves with a description of the method which a long experience has led us to believe to be the best, without referring to the great number of other methods which have been proposed.

The fluids removed must first be filtered. It is incorrect to assume that the slowness of filtration is a measure of the richness of the gastric juice in mucus. Indeed Hallopeau and myself have noticed that the products of artificial digestion filter the more slowly the greater the proportion of albuminoid substances and especially of peptone which they contain in solution.

We begin by estimating the total acidity. For that purpose a solution of caustic soda of the strength of four parts to the thousand (deci-normal solution) is necessary. A cubic centimetre of this solution corresponds to 3.65 milligrammes of hydrochloric acid. This solution is added drop by drop from a graduated burette to a test-tube containing 10 cubic centimetres of filtered gastric juice to which a few drops of an alcoholic solution of phenol-phthalein have been added. The completion of the operation is marked by the appearance of a beautiful bright red coloration, due to excess of the alkaline base.

Phenol-phthalein is frequently employed as a reagent in estimating the acidity of the gastric juice; but it is much better to employ litmus for this purpose. By means of this we obtain results apparently indicating a smaller amount of acid than we do when using phthalein; but neither peptones nor xanthin, hippoxanthin, etc., should be counted in estimating the total acidity. Furthermore, in estimating the proportion of free acids by Gautier's method, we have to use litmus. And when we employ phenol-phthalein to determine the total acidity and litmus to show the amount of organic acidity, the figures given by the latter are always too high.

A relatively simple manœuvre (A. Mathieu and Rémond) enables us to measure very exactly the quantity of fluid contained in the stomach. After a certain quantity of gastric juice has been withdrawn from the stomach a measured quantity of distilled water is added to it; this diluted gastric juice is poured back into the funnel and then passed into the stomach, so that the mixture may be complete. As much as possible of the diluted gastric juice is then withdrawn and collected in a special receiver. Let b represent the undiluted fluids withdrawn, a the acidity of this liquid, a' the acidity of the diluted liquid, q the quantity of distilled water introduced into the stomach. The amount of acid being evidently the same in the diluted liquid as in that to which no water has been added, we obtain the following equation:

$$ax = a'q + a'x.$$

which is equivalent to

$$x = \frac{a'q}{a - a'}.$$

The quantity of liquid originally contained in the stomach is then represented by the formula:

$$x = b + \frac{a'q}{a - a'}.$$

This very simple formula enables us to determine exactly the amount of liquid contained in the stomach at the time of examination, information which may be useful under many circumstances and from many different points of view. Of special value is the fact that this method allows us to refer the figures obtained, not to a hundred or a thousand parts, but to the total amount of liquid contained in the stomach. The absolute figures representing the proportion of acid and of chlorine naturally furnish information concerning the condition of digestion which is much more exact than that obtained by a mere knowledge of the percentage would be.

Qualitative Examination of the Gastric Juice.—At first coloring reagents were employed to determine the presence or the absence of hydrochloric acid in the gastric

juice. Originally methyl-violet was used, which turns from violet to blue in the presence of even a very minute trace of a free mineral acid. Many other qualitative reagents have been proposed. Uffelmann's reagent was used especially to determine the presence of lactic acid. One or two drops of perchloride of iron are added to 100 or 150 grammes of a one-per-cent solution of phenic acid; the solution acquires an amethyst or violet color. This color passes into that of yellow urine in the presence of a weak solution of lactic acid; but the solution decolorizes in the presence of hydrochloric acid. This reaction is only of slight importance and is moreover liable to give rise to error. Günzburg's phloroglucin-vanillin test is an excellent one for the qualitative estimation of hydrochloric acid. The following is the formula for this reagent:

Phloroglucin, ...	2 grammes.
Vanillin, ...	1 gramme.
Alcohol, ...	60 to 100 grammes.

A small quantity of this solution is gently heated over a water bath or over an alcohol lamp in a porcelain dish. A little of the gastric juice is added and the mixture is again heated. When free hydrochloric acid exists a very characteristic bright carmine ring appears in the porcelain dish before desiccation is complete.

Personally we use only ethyl-green, which is fully as sensitive as Günzburg's reagent and much more easily employed.

The solution should be made in distilled water; by reason of the enormous coloring power of ethyl-green powder, only a very small amount is required, about half a teaspoonful for a litre of distilled water. The solution thus obtained is not green but blue. In the presence of a small proportion of free hydrochloric acid the solution turns a grass-green; of 1½ to 2 parts per 1,000, a yellowish green; of 2½ to 3 parts per 1,000, the color of dead leaves. But this is not all; for the solution to which hydrochloric acid or gastric juice containing this acid has been added

decolorizes with a rapidity which is the more marked in proportion as the quantity of acid is greater. A very much larger quantity of organic acids (3 or 4 parts per 1,000 of lactic acid) is required to produce a grass-green color, such as is obtained with one part per thousand of hydrochloric acid, and furthermore there is no decolorization later.

Ethyl-green is therefore an excellent reagent, and in many cases it permits of a chemical diagnosis sufficiently accurate to enable us to undertake a treatment based upon the cause of the trouble, provided the total acidity has been previously determined. Let us suppose, for example, that the total acidity is from 2½ to 3½ parts per 1,000 and that the green reaction is very marked and its final disappearance is rapid and complete, then there is no doubt that hydrochloric acid is present. If the fluid examined has been obtained in the morning from a dilated stomach, the patient being fasting, there is continuous hypersecretion and dilatation of the stomach with stasis of its contents. If, on the other hand, the total acidity is weak (1⅓ to 1 per 1,000 or less), the green reaction is absent or doubtful and there is no final decolorization, then we have to do with an insufficient secretion of hydrochloric acid. A moderate acidity (1.6 to 2 parts per 1,000) combined with an evident green reaction affords probable evidence of a condition approaching the normal. Evident gastric stasis, high total acidity (2 to 3 parts per 1,000), and an absence of a green reaction point to dilatation of the stomach with stasis and abnormal acid fermentation.

We see therefore that a determination of the total acidity together with a qualitative examination of the gastric juice may serve to solve many diagnostic problems. The results obtained are, however, inferior to those which Winter's method gives, but as an offset to this the latter requires a more complicated apparatus and the consumption of much more time. It possesses the advantage of being not qualitative but quantitative, proportionally quantitative at least. It enables us to determine the quantity not only of free hydrochloric acid in the gastric juice, but also of the com-

bined hydrochloric acid. We learn thus the total amount of this acid furnished by the stomach, and obtain thereby much more accurate information concerning the physiological and even the anatomical condition of the gastric mucous membrane.

Winter's Method.—The gastric juice is filtered, and its total acidity is determined by the procedure above described. Five cubic centimetres of this filtered juice are poured into three porcelain capsules, numbered 1, 2, and 3. To the contents of capsule No. 1 an excess of carbonate of soda is added. The three capsules are then evaporated to complete dryness over a water bath. An excess of carbonate of soda in solution is now added to capsule No. 2 and the contents are again evaporated to dryness. The three capsules are then calcined over a Bunsen burner, but the heat should not be carried too far, the calcination being arrested when there are no more points of ignition. To capsules Nos. 1 and 2 a slight excess of pure nitric acid is added, and then some distilled water; this is boiled and thrown on to a filter. Capsule No. 3 is treated with boiling water simply, and this water is also thrown on to a filter.

The amount of alkaline chlorides contained in the liquid thus prepared is calculated by nitrate of silver in the presence of yellow chromate of potassium as a reagent. First the excess of nitric acid is saturated by pure carbonate of lime, then a few drops of a ten-per-cent solution of yellow chromate of potassium are added, and finally a deci-normal solution of nitrate of silver is added a drop at a time. The end of the operation is indicated by the appearance and especially by the persistence of a brownish-red coloration. A cubic centimetre of the deci-normal solution of nitrate of silver corresponds to 3.65 milligrammes of hydrochloric acid. The chlorine is also valued as hydrochloric acid.

What has taken place, and what is the significance of the figures obtained? In capsule No. 1 the free hydrochloric acid and that existing in combination have been

fixed by the carbonate of sodium as chloride of sodium; the chlorine found by analysis corresponds therefore to the total chlorine of the gastric juice. In capsule No. 2 the free hydrochloric acid has been dissipated by evaporation; the difference between the contents of the two capsules therefore represents the free, or rather the volatile, hydrochloric acid in the gastric juice examined. In capsule No. 3 the free hydrochloric acid has been evaporated and the acid in organic combination has been destroyed by calcination and dissipated; there remains then only the chlorine of the mineral chlorides, that is to say, the fixed chlorine. The difference between the chlorine in capsule No. 2 and that in capsule No. 3 indicates the quantity of chlorides destroyed by calcination, or, in other words, chlorine in organic combination.

We obtain thus the following data calculated for 1,000 parts of the gastric juice:

1. The total chlorine, T.[1]
2. Free hydrochloric acid, H.
3. Chlorine in organic combination, C.
4. Fixed chlorine (the chlorine of the mineral chlorides).

H + C represents the total quantity of hydrochloric acid secreted by the stomach. It is by far the most important information furnished by Winter's method. It should be remarked that it represents the difference of the figures of capsules 1 and 3. We may then, when employing a qualitative test, especially ethyl-green, dispense with an estimation of the amount of chlorine in capsule No. 2. It is the examination of the contents of this capsule that demands most time, for it has to be evaporated twice.

Hayem and Winter endeavor to obtain by their method information concerning the quality of digestion and the richness in organic acids of the gastric juice. They do this in the following way: they subtract from the total acidity the acidity due to free hydrochloric acid, A — H, and compare the result with the chlorine in organic com-

[1] These letters are those used by Hayem and Winter.

bination: $\frac{A - H}{C} = \alpha$. Now in the normal state $\alpha = 0.86$ nearly, because C is then always more than A — H. If α is above the physiological mean it indicates, say Hayem and Winter, that the organic acids are present in considerable quantity in the gastric juice. If, on the contrary, α is below the normal it is an evidence that an exaggerated amount of chlorine is present in combination with substances of organic origin under the form of a neutral or alkaline combination. This indicates a vicious chemical process, the chloro-organic combinations formed by the direct action of hydrochloric acid on albuminoid substances being always acid. Unfortunately the matter is much more complex than that. The total acidity of the gastric juice, especially when it is measured by the phenol-phthalein test, is the sum of the acidity of various substances, some known, others unknown; and we are ignorant as to what are the principal factors of this acidity. As to the chloro-organic compounds we know almost nothing of their nature, for how can we determine the significance of the quotient when both dividend and divisor are themselves incompletely determined?

This is not the place to criticise in further detail this particular point. What we have just said will suffice to show that the chemical analysis of the gastric juice by Winter's method gives certain results which are of value only as bearing upon the secretion of hydrochloric acid, free or combined, by the gastric mucous membrane. It is, however, true that it gives much more exact information than any of the other methods, and that this information is sufficient to serve as an indication for treatment.

The secretion of pepsin is in general proportionate to that of hydrochloric acid, although this rule is not absolute; for a certain gastric juice may be very rich in hydrochloric acid and yet not necessarily very rich in pepsin. It is indeed not very rare to find that a hyperacid gastric juice will peptonize in the test-tube only a very small amount of albumen. We can only judge of the value of

this secretion in an indirect manner, by qualitative or quantitative estimation of the peptone and by artificial digestion.

The qualitative estimation of peptone is made by what is called the biuret method; Fehling's solution may be used. To a urinary test-tube containing two or three cubic centimetres of filtered gastric juice, a few drops of Fehling's solution are added. If there is any peptone or propeptone present a rose color is obtained, which is the more marked in proportion as the quantity of peptone is greater. The albuminoid substances, when present, produce a purplish coloration. Quantitative estimation of peptone is a very delicate matter, demanding too careful manipulations to be described here.

Artificial digestion is easily accomplished when one has an oven the temperature of which can be maintained at 40° C. (103.5° F.). The substance used for digestion is a determined quantity of hard-boiled white of egg, which is kept in the oven for twenty-four hours. A certain amount of hydrochloric acid may be added. It is easy in this way to determine approximately the value in pepsin of any special sample of gastric juice. This method, which was formerly much employed, has now fallen somewhat into disuse, notwithstanding its real value.

Determination of the Organic Acids.—In general, when there is marked acidity, with little free or combined hydrochloric acid present, we must assume that the gastric juice contains a proportionately large amount of acids, derived from organic fermentation.

Professor Gautier has proposed an ingenious method for estimating the amount of free or combined organic acids. The acidity of the sample specimen of gastric juice to be examined is exactly saturated by soda; this is precisely the operation undertaken for the estimation of total acidity. The gastric juice thus neutralized is evaporated to dryness over a water bath, and is then calcined as in Winter's method. The residue, after calcination, is treated by boiling water; we thus obtain an alkaline solution. The alka-

linity of this solution is then measured by a standard deci-normal solution of sulphuric acid. The figures thus obtained represent a quantity of organic acids, free or combined, which have been destroyed by calcination. Indeed the addition of soda transforms the organic acids, free or in feeble combination, into the corresponding salts (lactate, acetate, etc.), and calcination reduces them to the condition of alkaline carbonates. In estimating the amount of these alkaline salts by sulphuric acid, we are able to determine what amount of organic acids they were combined with.

This estimation of the quantity of organic acids enables us to measure the amount of organic fermentation in the stomach and to determine whether this fermentation is weak, normal, or excessive. We have said above that in many cases the simple estimation of the total acidity and the employment of the ethyl-green test suffice to give information of a certain value concerning this organic fermentation.

One remark in conclusion: the estimation of the alkalinity of the solution obtained after calcination ought to be made in the presence of litmus; indeed we cannot retrace our steps after the use of phenol-phthalein and obtain a play of colors progressively from red to white. We ought then, in order to have comparable results, to use litmus also in estimating the total acidity.

We need say nothing of the examination for rennet, which, up to the present time at least, has not been shown to possess any clinical value.

The knowledge which we yet have concerning the chemical processes of gastric digestion is very incomplete. Nevertheless it may serve as a foundation for a clinical classification of the different varieties of gastric dyspepsia and may furnish very important indications for their treatment. We know unfortunately even less concerning intestinal digestion, and it is only indirectly, by examination of the excreta, that we can judge of the condition of the secretions and of the digestive work performed by the

intestine and its appendages. Boas has, however, devised a method of extraction by means of which we may sometimes obtain the duodenal juice by way of the stomach. He has in this way obtained a liquid which is capable of peptonizing albumen in an alkaline medium, and which contains therefore pancreatic juice. Up to the present time this procedure has not given us any data which may be of service from a diagnostic or therapeutic point of view.

GASTRIC MOTILITY.—It would be a matter of the greatest importance to be able to measure the motility of the stomach, and investigators have not been wanting who have applied their ingenuity in efforts to solve this problem. Indeed it is of little use to know the composition of the contents of the stomach, if we do not know to what degree the viscus empties itself, for we cannot then estimate its total work; and in fact we do not know how to measure this work. It is then difficult to apportion the blame to the stomach and intestine for the failure of nutrition which may result from a morbid condition of either of these organs, for we are unable to determine the precise relative degree of responsibility of these two organs in dyspepsia.

We know, however, that a weakened motility of the stomach leads to gaseous distention, to stasis of the liquids, and to abnormal fermentations. We have already said how a diagnosis of flatulence and stasis is made. Other very ingenious methods have been proposed for determining the degree of motility of the stomach, which we cannot completely pass over in silence.

Effervescent mixtures (bicarbonate of soda and tartaric acid) may be injected into the stomach and into the large intestine. From the distention thus obtained we may more readily determine the relative situation of these organs, and the degree of this distention may serve to indicate the degree of tonicity of their muscular walls.

Klemperer introduces a certain quantity of oil (150 to 200 grammes) and at the end of one or two hours he evacuates the contents of the stomach. The quantity of oil

recovered is inversely proportional to the motor power of the stomach. This procedure, which is open to serious objections, is rather frequently employed in Germany.

Ewald and Siewers have proposed the salol test. This substance has the property of not resolving itself into salicylic acid and phenol except in the presence of the pancreatic juice, and is accordingly not acted upon at all in the stomach. When atony and gastric stasis are present the salol will remain for a long time in the stomach, and because of its late arrival in the duodenum is split up only after a considerable interval; as a consequence of this its appearance in the urine will be much more tardy in the case of gastric atony or stasis than in healthy individuals. It has been objected to this test that the important point is not the moment of the appearance of salicylic acid in the urine,[1] but rather the persistence of its elimination by the kidneys. It has also been said, and this would take away all value whatever from the salol test, that the splitting up of the drug may take place in the stomach as well as in the duodenum.[2] The method is therefore more elegant than sure.

The best and most certain way is, however, to determine the time after a meal during which the alimentary substances remain in the stomach; this is, in fact, Leube's original method. We have already explained how much importance attaches to the finding of the remains of food in the stomach in the morning while the patient is fasting.

III. THE STUDY OF EXCRETA.—These excreta are the urine and fæcal matter. They have been only too rarely studied together and thoroughly in cases of disease of the digestive apparatus. Researches of this nature, long and troublesome it is true, would certainly give interesting results. We know what important facts bearing upon gen-

[1] This appearance is indicated by a very marked reaction: the addition of a few drops of perchloride of iron produces a very intense deep red color.

[2] Reale and Grande: "On the Decomposition of Salol in the Stomach," Rivista Clinica e Terapeutica, October, 1891.

eral pathology and diagnosis Bouchard has drawn from a study of the organic poisons contained in fæcal matter and urine.

Van Noorden[1] has made some experiments in the way of estimating the amount of nitrogen contained in the ingested matters, in the fæces, and in the urine. He succeeded by this means, in certain cases, in getting an idea of the actual condition of the total digestion of albuminoid substances. One of the most striking results which he obtained in this way was the demonstration of the fact that certain individuals, whose gastric digestion left much to be desired, nevertheless elaborated the nitrogeneous foods in the end in a normal way—a new proof that our various methods of examination of the stomach give us information concerning the anatomical condition and the physiological, chemical, and motor functions of the stomach, rather than concerning gastro-intestinal dyspepsia in its entirety. The facts which we are able to deduce from it are of much greater service in the way of an anatomico-physiological diagnosis of the condition of the gastric mucous membrane than as a measure of the degree of dyspepsia as a whole.

It was natural to look to a study of the urine as a means of obtaining information concerning the state of the digestive processes in the stomach and intestine; we shall presently show briefly in what that consists.

The study of the fæces has only been begun. Formerly it consisted in a simple macroscopic examination, in observing whether diarrhœa or constipation existed—an examination *en bloc*, so to speak; in certain cases the appearance of pus, blood, bile, or mucus forced itself upon the attention of the observer. The clinical estimate so formed is necessarily very gross, and it is astonishing that the fæces have not been made the subject of more accurate study, both chemical and microscopical. Physicians have not ordinarily, it is true, the time to devote to these tedious and repugnant researches, and to this cause is doubtless due the regrettable poverty of scientific material

[1] Zeitschrift für klinische Medicin, 1890.

bearing upon this important semeiological point. We owe to Nothnagel,[1] however, some interesting facts to which we shall refer later. It is not the place here to enter upon long details of this sort, for we must not forget that we are addressing practitioners. We would refer them in a general way, in the matter of technique, to special treatises and more particularly to those which have to do with the examination of the urine; we shall content ourselves with noting here briefly the results obtained and their value in a diagnostic sense, and shall be very sparing in our presentation of the technique of this order of investigations, which of necessity demand more or less special training.

The Urine.—In regard to the urine, which is always examined in the usual way for albumin, sugar, etc., we may determine: The total quantity, the total acidity, its richness in urea, in chlorides, and phosphates, in toxic substances, and in indican, phenol, etc.

Quantity of the Urine.—The urine is greatly diminished in quantity or even suppressed in cases of abundant vomiting, in profuse diarrhœa, gastro-intestinal hemorrhage, or occlusion of the intestine high up. After attacks of vomiting or gastric crises in neuropathic individuals, in the hysterical especially, we often note the appearance of polyuria—a point that may be not without a certain value in the diagnosis of nervous gastric affections.

Acidity of the Urine.—This is estimated in the same way as is the acidity of the gastric juice, the sample of urine tested being one taken from the total amount passed in the twenty-four hours, for the acidity varies much at different periods of the day. The same is true also of the chlorides and of the urea, and this fact must not be forgotten if we would obtain figures of any value whatever.

There seems to be a sort of balance between the acidity of the gastric juice and that of the urine, and when the gastric juice is removed artificially by the tube or naturally by vomiting the urine becomes alkaline. The acidity of

[1] "Beiträge zur Physiologie und Pathologie des Darmes," 1884.

the secretion is, on the other hand, increased when that of the gastric juice is diminished, and furthermore, according to certain writers, there is then an absence of the daily variations of acidity and alkalinity which take place in the normal state. The urine ordinarily becomes alkaline two or three hours after a meal, its acidity returning only after five or six hours.

According to Sticker and Hübner[1] we may, as a result of the examinations for acidity, draw the following conclusions:

a. An alkaline condition of the urine after lavage of the stomach or vomiting affords a presumption of hyperacidity or hypersecretion; an absence of variation indicates in like case an acidity of organic origin.

b. An absence of variation in the reaction of the urine, or an increase of its acidity some time after a large meal, is an indication of an insufficient quantity or of an absence of hydrochloric acid in the stomach.

Total Urea.—The quantity of urea excreted during the twenty-four hours with normal diet, which is neither too rich nor too poor in albuminoid substances, may furnish information of a certain value in diagnosis. In cases of hypersecretion of hydrochloric acid there is in general, when vomiting is not too profuse, an increased amount of urea in the urine. The presence of a normal quantity of urea in a case of hyperacidity in which emaciation has occurred indicates that the digestion of albuminoid substances is taking place in a satisfactory way, notwithstanding the poverty of the gastric juice in hydrochloric acid.

In cases of cancer in which the evolution of the disease has advanced rather far there is, in the majority of instances, a marked diminution in the quantity of urea eliminated (G. Rauzier).[2] A diminished amount of urea furnishes therefore only a probability of cancer, of cancer of the stomach in particular, and is not a pathognomonic

[1] Zeitschrift für klinische Medicin, Band 7.—Supplement Heft, p. 25 (quoted by Boas).

[2] Thèse de Montpellier, 1889.

sign as Rommelaere has claimed. An individual may indeed have a diminished secretion of urea without being cancerous, or may be cancerous and at the same time have a normal secretion of urea.

Chlorides.—Profuse vomiting reduces markedly the quantity of chlorides eliminated in the urine, a fact that is easily explained. Bouveret has thought that an increase in the relative proportion of urea and of the chlorides is a diagnostic sign of hypersecretion of hydrochloric acid. Instead of 2.3 which is the normal proportion,[1] the figures may be markedly increased. We do not think that this has any more value than the simple fact of the richness of urine in urea.[2]

Phosphates.—The presence of phosphates is of no more value for the diagnosis of cancer of the stomach than is that of urea. Urine rich in phosphates is frequently found in neuropathic subjects and consequently in dyspeptics. Such urine becomes turbid on cooling and clears up when heated.

Toxic Substances.—An odor of sulphuretted hydrogen has sometimes been noticed in the urine. This odor may be due to the putrefaction of this fluid (Müller). Less frequently (Bezt, Senator) sulphuretted hydrogen of intestinal origin has been found in urine which has not undergone putrefaction. In the case reported by Senator there were signs of marked indigestion with collapse.[3]

The presence of a notable quantity of sulpho-acids in the urine would indicate that there is an excessive process of putrid fermentation going on in the digestive tube. The methods of examination for these acids are too complicated to be described here. The same is true of the determination of the toxic quality of the urine, a process which can only be carried out in a properly fitted-up laboratory.

[1] 25 grammes of urea to 11 grammes of chlorides.

[2] A. Mathieu and L. A. Hallopeau: Société médicale des hôpitaux, December, 1891.

[3] H. Leo: "Diagnostik der Krankheiten der Verdauungsorgane," p. 293.

Indican, Phenol, Paracresol, etc. — We are able to demonstrate in the urine in certain cases the presence of aromatic substances, which owe their origin to the putrid decomposition of albuminoid substances; these are indol, phenol, paracresol, etc.

Indol is eliminated from the urine under the form of indican, the qualitative determination of which is very easy. Its presence in considerable amount indicates marked putrid fermentation in the intestine. This occurs in certain cases of constipation or of diarrhœa, especially in intestinal occlusion, in cancer of the stomach, and in purulent peritonitis. It has been asserted that indican is absent from the urine when the pancreatic digestion of albuminoid substances is insufficient. This is perhaps true in a certain number of cases; but indican is so often absent from the urine that it is impossible to attribute any special value to this sign. And on the other hand Thiroloix has shown that indican may be present in the urine of dogs from whom the pancreas has been removed.

To determine the presence of indican, 10 cubic centimetres of hydrochloric acid and about 1 cubic centimetre of chloroform are added to 10 cubic centimetres of urine. Then one or two drops of a concentrated solution of chloride of calcium are added by means of a glass rod; the mixture is shaken, and if indican is present the chloroform assumes a blue color in consequence of the indigo which has been formed. An excess of chloride of calcium hinders the production of this reaction. When the urine contains a trace of iodides an intense red color is produced; this is an excellent test for the iodides.

According to J. Munk,[1] man eliminates through the kidneys in health 0.017 to 0.051 gramme of phenol and of paracresol. In pathological conditions this amount may be increased to 0.31 or even to 0.63 gramme. This is sometimes seen in cases of ileus, of dilatation of the stomach, and of cancer of the stomach or rectum.

Fœces.—Special chapters will be devoted to a considera-

[1] Leo, *loc. cit.*, p. 317.

tion of constipation and of diarrhœa. We shall concern ourselves in this place only with the physical and chemical study of the fæcal matters, such as can be made by direct examination by the microscope, or with the aid of very simple chemical manipulations. We shall omit in this brief presentation everything which has no bearing on dyspepsia or on gastro-intestinal diseases. We shall indicate the means by which it is possible to detect in fæcal matters the presence of fat, of starch, of undigested alimentary detritus, of bile, mucus, pus, and blood, and show what their semeiological signification may be.[1]

Fat.—Fatty stools may appear under different forms. Sometimes they are solid, being made up of fat in great quantity, or they may be softened under the influence of heat. Sometimes they are seen to contain fat clots of greater or less size. In liquid stools we often see little drops of fat floating on the surface, the drops varying in size from mere whitish or grayish points to collections the size of a grain of rice or of a pea. The fat may be examined under the microscope or chemically.

Under the microscope it may be seen as little drops of pure fat, as crystals of fatty acids, or as colorless or yellowish clots. The fatty drops, which are easy of recognition, are seen when the patient has been on a milk diet, or after the use of cod-liver or castor oil. When they are very numerous they indicate defective resorption of fat (fatty diarrhœa of nursing infants). The crystals found may be either crystals of fatty acids which melt when gently warmed, or saponaceous crystals which do not melt with heat; the first are soluble in ether, the second are not.

According to Müller,[2] the presence in the stools of a large quantity of fat crystals is an indication rather of an imperfect resorption of fat than of a vitiation of the pancreatic secretion. A large number of these crystals are found in patients who have no lesion of the pancreas, in those

[1] Nothnagel: "Beiträge zur Physiologie und Pathologie des Darmes." H. Leo, *loc. cit.*, Berlin, 1884.

[2] Zeitschrift für klinische Medicin, Bd. xii., p. 45.

with jaundice, and especially in patients in whom there exists an obstacle to resorption by the chyliferous vessels, as in diseases of the peritoneum and of the mesenteric ganglia, for example.

The clots sometimes found are formed of neutral fat, most frequently with a lime base; they melt under the influence of heat, and are reduced to pure fatty acids in the presence of sulphuric acid.

Chemical Examination.—Müller, in the work above cited, has described an interesting method for the determination of fat in the fæces. The dejecta are treated by strong acids and then by an alcoholic solution of potash, and finally exhausted by ether; an examination is now made to determine the temperature at which the substance thus obtained melts. The point of fusion is higher (50° to 51° C.—122° to 124° F.) in the normal condition with little fat than it is (46° to 48° C.—114° to 118° F.) in a pathological state when much fat is present. The solidification of the substance by cold gives in the same sense even more marked results. Müller also shows how we can extract the fat by ether and measure its amount when it exists in the stools in the form of neutral fat, of fatty acids, or of soaps. But we cannot describe these processes here.

What is the semeiological value of the presence of fat in the dejections? In the normal condition, according to Müller, we may find from 7 to 14 grammes of fat; and this amount may be increased to 40 or even 75 grammes in pathological conditions, as in icterus. In the healthy individual fatty stools may be the result of a diet very rich in fats (milk, medicinal oils, etc.). In diseased conditions they may be found:

1. When the bile necessary for the digestion of fats does not pass in sufficient quantity into the intestine. It has not been shown, in spite of the generally received opinion to the contrary, that there is such a thing as stearrhœa from pancreatic insufficiency.

2. When there is any lesion of the channels through

which a fat is absorbed (intestinal ulceration,[1] tuberculous enteritis, amyloid degeneration of the intestine, peritonitis, or lesions of the mesenteric ganglia).

3. When the pancreas is injured or the canal of Wirsung obliterated, the stools will be found to contain fat in the form more especially of combined neutral fat, while in the normal condition it is almost always split up into fatty acids and into soaps under the influence of the pancreatic juice (Müller).

Starch.—This occurs in the form of minute bodies which are colored blue by the following mixture of iodine and iodide of potassium:

Iodine, ...	1 gramme.
Iodide of potassium, ...	2 grammes.
Water, ...	300 "

Nothnagel regards the appearance of starch corpuscles in considerable quantity in the stools as an indication of an exaggerated peristaltic action of the bowels; it is a common phenomenon in diarrhœa. The presence of these corpuscles has, however, no special value from the point of view of a diagnosis of any very marked lesion of the intestine or pancreas (Müller).

Alimentary Detritus.—There are always incompletely digested muscular fibres to be seen in the stools of an individual who is on a mixed diet, and there are very many of them when the diet is largely composed of meat. The quantity of undigested muscular fibres is always increased in cases of intestinal catarrh.

The undigested remains of food to be met with in the dejecta are of the most varied sort. In addition to the fatty substances, starch granules, and muscular fibres, to which we have already referred, there is always a large amount of food particles which escape digestion; among these are cellulose, connective-tissue fibres, pieces of tendon, vegetable seeds and fibres, etc. It is hardly necessary to remark that a vegetable diet will furnish a much

[1] Stadelmann: Deutsches Archiv für klinische Medicin, Bd. xl., p. 372.

more abundant residue than one composed chiefly of nitrogenous substances.

In the diarrhœa of nurslings we often find partially digested curds of milk, a sufficient evidence of impaired digestion.

Sometimes, in diarrhœic stools, little transparent masses are found which resemble boiled tapioca or frog spawn. These were formerly thought to be produced by the mucus accumulated in ulcers of the large intestine, but Virchow believes them to be of vegetable origin, and Nothnagel agrees with him in regarding them as vegetable particles, either starch or little pieces of fruit.

The Bile.—In the normal state the bile does not appear as such in the fæcal matters, which, however, owe their color to the transformed bile pigments. Bile, as bile, may appear in the stools under one of two forms: it may stain yellow shreds of mucus, fat, collections of crystals or of epithelial cells, and may appear in the form of little clots or flocculi of a greenish-yellow color; or it may be intimately mixed with the liquid stools.

Nothnagel considers the flocculi (of mucus or other matters) colored by bile as an indication of an inflammatory lesion of the small intestine, for he says that bile would never stain mucus in the large intestine.

The bile is intimately mixed with liquid fæcal matters when there is an intense catarrhal inflammation of the small intestine associated with rapid evacuation of its contents. This is hardly ever seen except in very young children. The bile stains the napkin, and gives the characteristic reaction in the presence of nitric acid. The stools are then green and acid in reaction. This is one of the most important varieties of diarrhœa in infants, and should not be confounded with the green diarrhœa caused by Lesage's bacillus.

Mucus.—The conditions under which mucus appears in the stools have been well studied by Nothnagel.[1] Mucus

[1] "Beiträge zur Physiologie und Pathologie des Darmes," Berlin, 1884.

is normally a constituent of the fæces, but what makes its presence abnormal is its quantity and the manner in which it is mixed with the other fæcal matters; these points may furnish indications concerning the localization of the inflammatory process in the intestine (Nothnagel).

Mucus may show itself in the stools under one of three different aspects:

1. It may be isolated, unmixed with the other fæcal matters.

2. It may form a coating to the formed fæcal masses.

3. It may be more or less intimately mixed with the dejecta.

1. When the mucus is found unmixed with the other matters it indicates an inflammatory condition of the rectum or of the descending colon. It may appear in the form of little lumps, of slimy masses, or of membranes, ribbons, or tubes (muco-membranous enteritis). These products dissolve in large part in alkaline solutions; and a precipitate of mucin is obtained by the addition of a slight amount of acetic acid.

2. Mucus forming a coating to solid masses of the dejecta is met with in health as a fine envelope of hyaline mucus surrounding the formed fæcal cylinders. The presence of a thicker opaque, yellowish coating surrounding egg-shaped masses of fæcal matter is a sign of inflammation of the descending colon and rectum.

3. Mucus mixed with the fæces appears under different aspects according as it is more or less abundant and as the mixture is more or less perfect. There may be flocculi or little collections of mucus, visible to the naked eye, floating in a watery discharge or disseminated among the solid matters under the form of masses resembling frog spawn or boiled tapioca. This appearance is an indication of the existence of inflammation of the colon extending into the cæcum. We have already said that when these masses of mucus are stained by bile we must recognize the fact, following Nothnagel, that there is at the same time a lesion of the small intestine.

The mucus may be so intimately mixed with the fæcal matters that it is impossible to recognize it except under the microscope; that is an evidence of a lesion limited to the cæcal region. When at the same time with this intimate admixture there is also a coating of mucus on the formed masses, we may conclude that there is at once a lesion of the initial and of the terminal portions of the large intestine. The presence of grumous masses resembling frog spawn or boiled tapioca is not, in Nothnagel's opinion, an indication of ulceration of the colon.

Blood.—This may be present in greater or less amount and more or less modified by digestion.

Red blood accompanying formed fæcal masses is an evidence of a lesion of the rectum or anus, most commonly hemorrhoids. Red blood accompanying liquid stools may come from higher up in the bowel, even from the small intestine, as is seen more especially in typhoid fever when the hemorrhage has been abundant. Nothnagel calls attention to a point of some importance, viz., that when small quantities of blood are found in the stools of a patient with typhoid fever we should be on the lookout for a profuse hemorrhage within a short time; sometimes these little premonitory hemorrhages can be detected only on microscopical examination.

When the blood comes from the stomach or duodenum it is often of a black color like tar, or soot beaten up in water. Usually the blood is easily recognized in this form by simple inspection, but sometimes it must be more carefully examined before its true character can be determined. The blood corpuscles may be looked for under the microscope, where they will be seen more or less deformed, or a search may be made for hæmin crystals.

The following procedure may be used for the detection of hæmincrystals: the liquid to be examined is evaporated carefully without too much heat in a watch-glass held in the hand over an alcohol lamp. A piece of the desiccated product the size of a millet-seed is put upon a glass slide and to this a small grain of sea-salt, together with

two drops of acetic acid, is added; the acetic acid is evaporated gently over the lamp; a little more is added and again evaporated; a few drops of water are then added, a cover glass is put over it and it is examined under the microscope in order to discover the characteristic crystals of hæmin.

The blood may also be examined by means of tincture of guaiac. To a small quantity of the liquid to be examined about one cubic centimetre of fresh tincture of guaiac and one cubic centimetre of the following mixture are added:

Crystallized acetic acid, . . .	2 grammes.
Distilled water, ...	1 gramme.
Essence of turpentine,	
Rectified alcohol, ...	āā 100 grammes.

The mixture is then thoroughly shaken. If there is any blood, a blue color is produced.

Spectroscopic examination is, as is well known, the most sensitive means of demonstrating the presence of blood.

Examination of blood present in the vomited matters is made in exactly the same way.

Pus.—This is sometimes abundant enough to be recognized by the naked eye, but it is rarely found in considerable amounts except when some purulent collection has opened into the colon or the rectum.

In cases of lesions of the rectum, of the upper part of the colon, or of the sigmoid flexure we may find small quantities of pus recognizable by the naked eye and under the microscope. This is not the case when ulcerations are present higher up in the bowel, so that, although the presence of pus is a symptom of intestinal ulceration, it is not always safe to count upon it in the diagnosis of this condition. It is probable that the pus is destroyed *en route*, is either dispersed or digested. Hemorrhage is therefore in this sense a sign of much greater importance.

There does not seem to be any simple purulent catarrh of the intestinal mucous membrane, like bronchial catarrh for example; Nothnagel has shown by numerous examina-

tions that there is no purulent secretion without ulceration in the intestine.

We shall have to content ourselves here with these elementary remarks on examination of the fæces. We cannot enter into a study of intestinal parasites (worms, protozoa, bacilli), as that would demand too long and minute a consideration.

PART II.

GENERAL CONSIDERATIONS ON DIET.

BEFORE taking up in succession the different clinical forms of dyspepsia, we think it would be well to make a short study of the diet appropriate for this condition. We shall thus be able to dispose of a few preliminary details for which it would be difficult to find a place in the chapters on special diseases, and on the other hand we shall be able to avoid needless repetitions.

Physiologists have arrived at very concordant results in regard to the quantity of alimentary substances of the three kinds which is necessary to the maintenance of life in an adult man. According to the mean of the analyses made by different observers,[1] a man in repose requires each day 100 grammes of albumen, 45.4 of fats, and 373 of carbohydrates. For a man who is actively exercising the figures should be a little higher than these. Voit estimates the necessary amount as follows: albumen, 118 grammes; fats, 56; carbohydrates, 500.

These substances are not found in food in a state of purity, but are mixed with each other and also with other substances which are not capable of being digested at all. Furthermore a certain proportion of the digestible matters pass through the alimentary canal without having been acted upon by the digestive juices. The quantity of food taken ought, therefore, to be appreciably greater than the amount of pure nitrogenous or carbonaceous substances necessary for the maintenance of the organism.

A. Gautier has drawn up an average diet table for an inhabitant of Paris, using as a foundation the statistics of

[1] A. Gautier, "Cours de Chimie," vol. iii., p. 796.

the amount of food-stuffs passing through the municipal custom-house during a period of several years. We reproduce this table here because it gives at the same time the average quantities of albuminoids, fats, and carbohydrates contained in the different varieties of alimentary substances.[1] It will be remarked that the results thus obtained are very similar to those that physiologists have arrived at by very different processes.

Nature of the Foods.	Amount per Day per Head.	Albuminoids.	Fats.	Carbohydrates.
Bread	410	36.9	4.8	184.5
Meat (fish, game, fowl, butcher's meat	266	53.0	41.0	3.0
Vegetables (fruit, 98; fresh vegetables, 100; potatoes, 100)	298	12.5	1.6	60.1
Eggs	25	3.6	3.5	trace
Milk	150	7.1	6.0	6.0
Cheese	6	2.0	1.2	trace
Butter	25	0.3	20.0	0.0
Sugar	40	0.0	trace	40.0
Salt	18	0.0	0.0	0.0
Wine (about half a litre).	500	trace	trace	40.0
Total		115.4	48.1	333.6

Healthy individuals have no great difficulty in regulating the amount of food to their needs; it is only necessary for them to be able to procure a sufficient variety. It is not the same in case of disease, when digestion is not normally accomplished. It is then necessary to take food only in sufficient amount, not too much, and in such shape as will permit of its digestion under the unfavorable conditions in which the gastro-intestinal tube is performing its functions. This adaptation of food to morbid indications constitutes diet, which occupies an important position, the first indeed, in the treatment of dyspeptic conditions.

Diet.—Each of the clinical forms of dyspepsia, primary

[1] The same work contains a table showing the chemical composition, richness in water, salts, albuminoids, etc., of the different foods.

or secondary, presents special elementary indications to which we shall refer in detail later. Here, we would give only certain general indications as to what ought to be the diet in the treatment of dyspepsia, and as to the conditions which the different diet tables are expected to fulfil in the management of diseases of the stomach.

The first condition of a diet list is that the three orders of alimentary substances should be represented there in suitable proportion, for they cannot be substituted one for the other, and the insufficiency or absence of one of them would produce actual starvation.

Various authors have drawn up tables showing the proportions in different foods of albumen, fats, and carbohydrates. Dujardin-Beaumetz in particular has inserted in his book on the treatment of diseases of the stomach a colored table which presents in a way very striking to the eye the relative richness of different substances in nitrogen, carbon, fat, and water. By a reference to this it will always be easy to determine whether the diet that one has ordered is sufficient and suitably proportioned. Space will hardly permit us to reproduce tables of this kind here.

The great difficulty is especially to prescribe food which may be utilized without causing suffering in different forms of dyspepsia; to prescribe food which demands of the digestive tube a minimum of work, and which leaves the least possible injurious residue.

This is the difficult problem of the digestibility of foods, and of their digestibility applied to different cases. We shall consider for the moment this digestibility only in a general way. It must be owned that in this respect certain and precise data are wanting. The classification of foods according to the sensations felt during their digestion must be very indefinite, varying according to the individual, and consequently can have no general application. Observations made on dogs killed while digesting (Leven), on individuals with gastric fistulæ (Beaumont, C. Richet), studies made on persons who can vomit at will

(Gosse), have only a limited value; they are particular cases, the expression of certain individualities, that is all. Besides, these experiments have given hardly any information except as to the greater or less duration of time during which foods remain in the stomach. Long and careful chemical examinations would be necessary to give us anything certain in this respect as regards not only the healthy individual but also the sick. It is the latter in whom the physician is especially interested.

In the mean while writers have contented themselves with the table of digestibility drawn up by Leube. This experimenter emptied the stomach by a tube from five to seven hours after a meal, and took account, not of the chemical state, the most important, but of the physical condition of the foods. He has in this way drawn up the following list, which we give as a matter of instruction for what it is worth. The different foods are there arranged in the decreasing order of their digestibility.

First Dietary.

Bouillon.	Biscuit.
Meat solution (Leube-Rosenthal).[1]	English cakes (Albert biscuit).
Milk.	Water.
Raw eggs.	Natural carbonated waters.

Second Dietary.

Boiled calves' brain.	Boiled squab.
Sweetbreads, boiled.	Tapioca soup.
Boiled spring chicken, without the skin.	Œufs à la neige.[2]

[1] The Leube-Rosenthal meat solution is prepared in the following way: finely minced beef is cooked in a Papin digester for twenty-four to thirty-six hours, hydrochloric acid having been added. This acid is saturated before the food is given.

[2] White of eggs beaten up into a light froth, then cooked in boiling milk and sweetened.

Third Dietary.

Raw beef, finely minced.
Raw ham, finely minced.
Rare beefsteak.
Tenderloin of beef (reduced to a pulp).
Mashed potatoes.
Stale white bread.
Tea and coffee, with milk.

Fourth Dietary.

Roast chicken.
Roast squab.
Roast venison or partridge.
Cold roast beef.
Roast veal.
Boiled salmon.
Maccaroni.
Boiled rice.
Spinach finely minced.
Asparagus.
Steamed apples.
White or red wine, well diluted.

Certain of the indications given by Leube may assuredly be utilized; for example, the physician may find suggestions there for a diet list for convalescents or even for certain dyspeptics. In Germany cold joints are often advised in cases of dyspepsia; indeed, one might say that they actually have "cold-roast cures."

We shall content ourselves here with giving certain general indications applicable, as it were, to all cases of dyspepsia in common. There are a certain number of conditions, as regards both the nature and external form of the food, which are essential before the latter can be admitted into the dietary of dyspeptics.

The food should be: 1, finely divided; 2, in sufficient quantity, but not in excess, and varied in such a way as to furnish albuminoids, carbohydrates, and fat in sufficient amount and due proportion; 3, as far as possible rendered unirritating to the mucous membrane of the stomach and intestine; 4, and finally should contain toxic products in minimum amount. We will inquire into the reasons for these different essentials and the means of realizing them.

1. The fine division of food has two principal advantages: it brings the nutritive material in most intimate

contact with the digestive juices, and it also renders the passage of the alimentary substances through the digestive tube more easy. Under these conditions the mass of ingested material need not be so great, since it is better elaborated and its utility to the organism is proportionately greater.

2. The three varieties of substances, united in suitable proportions, must be in sufficient but not too great quantity. Absolute insufficiency or a relative insufficiency of one of the essential ingredients would necessarily reduce nutrition below the normal. Sometimes the problem is more difficult, as when we have to devise a means of introducing into the circulation some substance which the alimentary canal digests with difficulty—for example, carbohydrates when there is hyperacidity, or albuminates when there is a deficient secretion of hydrochloric acid. In most cases of dyspepsia, always, in fact, the overloading of the digestive tubes should be avoided, for this is, generally speaking, one cause of stasis and of abnormal fermentation, with all their evil consequences. It is for this reason that we often are obliged to diminish the quantity of, if not to suppress entirely, those aliments which contain too great an amount of indigestible waste. In this category belong especially vegetables and green fruits very rich in cellulose. These substances, although they have in certain cases the advantage of being laxative, more often possess the inconvenient property of affording little nourishment and at the same time being bulky.

3. All substances which are needlessly exciting or irritating to the stomach and intestine ought to be avoided. Spices, condiments, and strong liquors are the best examples of this class of irritants. The use of condiments ought to be restricted to a minimum in the different forms of dyspepsia, salt alone being permitted. Indeed in all cases of dyspepsia it should be our aim to avoid the production of gastritis if it does not already exist, and to moderate its severity or even bring about its cure if it is already present. The culinary preparation of food ought,

therefore, to be simple, while at the same time regard should be had for variety and palatableness. Seurre has given, in his "Étude Pratique sur les Maladies de l'Estomac" (1885), some practical advice in this respect which might be followed with profit.

4. The poisonous products which arise during fermentation of food in the stomach may be injurious locally or at a distance; we should endeavor, therefore, to prevent their introduction, or restrict as far as possible their production in the stomach and intestine. Putrefaction develops many of these products, and we ought therefore to avoid game or meat which is too high, strong cheese, and the like. Other substances which are still wholesome undergo fermentation too readily and therefore furnish material for toxic or irritating products. Among these are sugar and fatty substances.

The first place, leaving out of consideration milk and its special preparations, of which we shall speak further on, belongs then to meat, eggs, fish, preparations of farina, and thick soups; these are the only varieties of food which remain after the above-mentioned eliminations have been successively made.

Meat.—In order to conform to the desiderata previously enumerated, meat must not be too fat and should be simply prepared, fresh, and very finely divided; it may be cooked or raw. We shall speak below of meat powder, which deserves a special study by reason of the peculiar conditions of its elimination.

Raw meat may be especially useful in cases of convalescence, of anæmia, of chlorosis, of neurasthenia where there is much debility, and of excessive secretion of hydrochloric acid. Mutton or horse-flesh is preferable to beef, since it does not expose the patient to the danger of tape-worm. This may be prepared in several ways: it may be passed through a hashing machine of the kind made in America, which has the disadvantage, however, of drying the meat, or it may be minced or scraped with a knife. When it is desired to mince it very fine it should first be cut up in

larger pieces by the butcher, all the white parts, such as fat, tendons, vessels, etc., being removed, and then hashed up fine at home. It should then be picked over again to remove all the white parts that may still remain. To complete the operation it may be worked up in a mortar or passed through a sieve.

Scraping with a knife is even preferable to mincing. A piece of a leg of mutton is placed on a board and scraped with a dull knife; the meat is turned over from time to time and the pulp is collected in a bowl. This process, when well done, demands much care and attention. When a mechanical pulper is used, which, as we have said, has a tendency to dry the meat, the latter should be cut into small pieces and freed from all fat, tendons, etc., before being put into the machine. This removal of the white parts should always be attended to so as to avoid introducing into the stomach any substances which are difficult of digestion and which would tax the organ uselessly.

Pulped raw meat may be taken in different ways: it may be stirred into bouillon, which must not be too hot, for fear of coagulating the meat and hardening its fibre, or it may be given in tapioca or mixed with purées. In the case of children it may be easily given by mixing it with preserves, but for most dyspeptics such an amount of sugar would be apt to cause trouble. It may, as Seurre advises, be lightly cooked on a gridiron and moderately seasoned. It may also be fried with a little butter, a mode of preparation that I often employ for convalescents from typhoid fever.

Cooked Meat.—We may use beef, veal, lean pork, mutton, and chicken, and the different kinds of meat may be either boiled, roasted, or broiled. We may also reduce cooked meat to pulp and thus vary its administration. The meat may be given alone, lightly seasoned, or in thick soups, or with scrambled eggs. Ham may be prepared in the same way, raw or cooked, but especially when raw it mixes very well with eggs. A cook who possesses a little ingenuity may provide a great variety of ways in which

to give nitrogenous food, while using only pulped meat. The latter has a very great advantage over ordinary meat, since simple mastication can never divide meat sufficiently. Pulped meat may also be combined with the aliments which go to make up what we call a vegetable diet, of which we shall speak further on. It will be seen that in moderate cases of dyspepsia it is easy, with milk as an adjuvant, to prepare quite varied bills of fare which will fulfil the general conditions that we have enumerated above.

Meat Solutions, Peptones.—We have described above the preparation of meat solution by the Leube-Rosenthal method. There are many other analogous formulæ which we do not think worth while to reproduce here.

Prolonged boiling in a closed vessel will dissolve out a certain quantity of gelatin which, according to some authors, is utilizable as albumen. Without denying that these concentrated gelatinous soups may have their place, they certainly ought to be used only temporarily when better preparations are not acceptable to the patient, or when we desire to vary a monotonous bill of fare. It is more useful during convalescence than in cases of true dyspepsia.

Meat juices have only a very feeble nutritive value, and we should not deceive ourselves on this point.

Peptones are of no use whatsoever. Their composition is too variable and too complex, and it has never been shown, furthermore, that artificially prepared peptones are susceptible of absorption and assimilation. We are far from having solved all the mysteries of the chemistry of digestion and from being able to obtain in a test-tube chemical actions which are equivalent to those that take place in the digestive canal under normal conditions.

Extracts of meat are also without any alimentary value; they are useful only to make soup and, like bouillon, serve only as a peptogenous aliment, if we admit the well-known theory of Schiff and Herzen. According to these authors bouillon, little nutritive as it is in itself, is of value in the

way of recharging the glands which have been exhausted of propepsin; in other words, it is peptogenous. Here we see the possible utility of taking soup at the beginning of a repast, but it would be more logical, if this theory is correct, to take our bouillon a little while before the meal.

Milk and its Derivatives.—Milk is the food which should serve as the exclusive nourishment of the mammifer during the first period of its life; it is therefore a complete food, the composition of which, however, varies considerably according to the species.

What is the quantity of milk necessary for the support of an adult man? This question is easily answered by comparing the figures of a diet of maintenance with those furnished by an analysis of milk. The normal ration of maintenance ought to contain, taking the extremes indicated by various writers:

Albuminoids, . . .	. 100 to 120 grammes.
Fatty substances, . .	. 40 to 55 "
Carbohydrates, . .	. 375 to 500 "

On the other hand, the different varieties of milk have on the average and in round figures, according to the table given by Gautier,[1] the following composition, indicated in grammes per litre:

	Woman.	Cow.	Ass.	Goat.
Albuminoids	20	50	20	87
Fatty substances	45	40	15	85
Milk sugar	70	55	58	27

A very simple calculation will give in round numbers the quantity needed of these different kinds of milk to furnish the proper amount of each of the substances entering into the composition of a normal diet. The following table gives these amounts expressed in litres:

[1] "Cours de Chimie," vol. iii., p. 711.

	Woman.	Cow.	Ass.	Goat.
Albuminoids	5 to 6	2 to 3	5 to 6	1.50
Fatty substances	1.50	1.50	3	0.75
Milk sugar	5 to 6	6 to 7	6 to 7	16.00

If we order four litres a day of cow's milk, an amount quite frequently given, we obtain:

Albuminoid substances,	200 grammes.
Fatty substances,	160 "
Milk sugar,	220 "

There is in this a slight excess of nitrogenous substances, a considerable excess of fats, and a notable deficiency of carbohydrates. It is pre-eminently, as Germain Sée has remarked, a fatty diet. This excess of fatty substances explains the fact that the stools are white or yellowish, certainly very rich in butter, during the continuance of a milk diet. It is therefore advisable to use partially skimmed milk. With 5 litres of milk from which about two-thirds of the cream has been removed, there would still be an excess of fat and a deficiency in carbohydrates. A milk diet cannot therefore be continued for a long period of time in an adult, and especially in an adult who is working, because of the enormous quantity of liquid that he is obliged to take. It is possible, it is true, that fatty substances may partially replace the carbohydrates in the functions of oxidation and the production of energy, but in order to obtain that result they must be digested and absorbed, and we have no sufficient data in relation to their absorption and utilization in the economy.

A milk diet, notwithstanding the richness of this substance in fat, is a lowering diet when employed alone, but a fattening diet when the milk is given in addition to other substances. It is easy to understand why.

Every-day experience teaches us that milk is an excellent curative agent in a large number of cases of dyspepsia. We must now endeavor to understand the nature of this

beneficial action in order that we may know clearly what we can and should demand of milk in these cases.

When once it has entered the stomach the milk coagulates. This coagulation, which was formerly thought to be due to the acidity of the gastric juice, is perhaps due rather to the presence of a special ferment which has been studied by Hammarsten. This ferment is called rennet (German, *Lab;* French, *présure*). This rennet coagulates milk in an alkaline medium. According to the researches of many authors the rennet would appear to be the last substance which disappears when the mucous membrane of the stomach is progressively destroyed by gastritis. It is this fact, perhaps, which explains the good effects of a milk diet in cancer of the stomach and in certain chronic destructive forms of gastritis. As this coagulation occurs in an alkaline medium we can also understand the good effects produced from this point of view by the administration of alkaline substances in rather large doses, especially when there is a tendency to hyperacidity.

Many attribute a specially happy action to lime salts in the digestion of milk. According to Hammarsten the presence of soluble lime salts is necessary in order that coagulation of casein may take place. Under such circumstances, according to Arthus and Pagès,[1] a special chemical reaction occurs, viz., formation of an earthy albuminate. The gastric rennet acts in an alkaline medium; now it is probable that the milk introduced into the stomach is only very feebly acid and that it even remains alkaline there for a considerable period when it has been previously alkalinized. The coagulation of the casein takes place, therefore, without the intervention of lactic acid, which is a great advantage.

It is very probable that in the normal condition the gastric digestion of milk is limited almost exclusively to this precipitation of the casein, and that a very small part only is peptonized in the stomach. Writers are far from being in accord as to the time that milk remains in the stomach;

[1] Quoted by Hayem, *loc. cit.*, p. 316.

this time must vary greatly in individual cases, but it would appear that it is in general less prolonged than in the case of other alimentary substances. Leube, as we have seen, ranks milk very high from the point of view of its digestibility, that is to say, of the rapidity of its disappearance from the stomach.

The coagulum produced by the precipitation of casein varies in appearance in individual cases and also according to the kind of milk that is ingested. The curds of cow's milk are always larger than those of human milk. It is possible, also, that the coagula are larger in dyspeptics in whom the motility of the stomach is weakened. Milk tends to cause the disappearance of free hydrochloric acid, which doubtless combines with the casein; it acts, therefore, somewhat like an alkali. To this fact, in part, are due the good effects seen in the case of round ulcer and hyperacidity. It also acts in a comparatively slight degree as a stimulant to the gastric mucous membrane, as might *a priori* be supposed, the result of which is that there is a less abundant secretion of hydrochloric acid (Hayem).

It is true that the lactose which it contains may ferment in the stomach and give rise to the formation of lactic acid, the presence of which is easily determined by qualitative tests. This undesirable effect may be moderated or even prevented by the simultaneous administration of an alkali, and this should always be done when there is a tendency to hypersecretion of hydrochloric acid and to stasis of the gastric contents.

We have seen that a full milk diet has serious disadvantages; in order to supply nutritive substances in sufficient quantity we must give an excessive amount of liquid, and this may lead to dilatation of the stomach (Debove). And when we give only three or four litres of cow's milk there is a notable deficiency of carbohydrates. A milk diet, indeed, ought to be only a temporary affair, and we should, as far and as soon as we can, add other articles of food and especially starchy matters. We may also add sugar

of milk in order to make up the deficiency in carbohydrates; we have done this with advantage in cases of hyperacidity, and it is a measure worth trying.

Foods Derived from Milk.—Milk is the basis of a certain number of alimentary products, especially designed for the treatment of gastro-intestinal affections. The principal preparations of this kind met with in commerce are the following: sterilized mlik, condensed milk, milk powder, peptonized milk with diastase, milk to which pancreatin has been added, kumyss, kephir. Sterilized milk has seemed to be really useful in the treatment of certain forms of diarrhœa, especially in infants (Sevestre, Comby, Hayem). There is no reason why it should not also be tried in the treatment of diarrhœa in adults and especially in the treatment of certain forms of chronic diarrhœa. It would be logical to employ it also in cases of dilatation of the stomach with permanent stasis, excessive fermentation, etc.

Condensed milk and milk powder would find a rational application in the same cases as meat powder, but they are much inferior to the latter.

Kuymss and kephir are forms of fermented milk the use of which has been greatly vaunted, especially in the treatment of tuberculosis, and they have also, kephir especially, been much employed in dyspepsia. Hayem, who is a great advocate of this preparation, has made an interesting study of it, of which the following is a *résumé:* Kephir is milk fermented by means of a special yeast which is much used by the natives of the Caucasus; it is a mixture of ordinary yeast and a special bacillus. The kephir made in Paris, according to an analysis made by Winter, contains very little alcohol, a large amount of carbonic acid, from 3 to 6 parts per 1,000 of lactic acid, a small quantity of sugar of milk, and from 7 to 8 parts per 1,000 of albumin or of syntonin (acid albumin). Its acidity is due chiefly to the presence of free lactic acid, and probably also to the presence of this acid in nitrogenous combination.

Kephir has been employed with success by Lépine, Weiss, and O. Wyss, in simple ulcer of the stomach; by Dujardin-Beaumetz in alcoholic gastritis; by Stern and Löwenstein in gastric catarrh; Hayem regards it as the best remedy for pronounced hypopepsia or apepsia. It is regarded as a stimulant of the gastric secretion and motility, and it is therefore of little service when the greater part of the mucous membrane of the stomach has been destroyed. Kephir is especially indicated in chronic enteritis and in diarrhœa; its good effects in the latter condition are attributable to the large proportion of lactic acid which it contains (Hayem). It has always a tendency, when taken continuously, to induce constipation. It should be given in small quantities at the beginning, not more than two bottles, part of which is to be taken with meals and the remainder between meals. When three bottles a day are taken the patient should avoid other fluids. The dose may be gradually increased up to six pints or more in the twenty-four hours. Certain patients cannot tolerate it, and it is contra-indicated in cases of pronounced dilatation with stasis.

One may readily understand from its composition that kephir is an excitant of the stomach; its rather marked acidity and its richness in lactic acid show that one ought not to judge merely from the acidity of the gastric juice as to the intensity and the gravity of dyspepsia. The great question, the principal one in fact, is to know how and with what rapidity the stomach empties itself of its contents.

Food Powders.—M. Debove was the first to make use of meat powder in the treatment of pulmonary tuberculosis. The good results which he obtained by feeding with the tube, even when there were signs of marked indigestion present, led to the employment of meat and other food powders in cases of primary dyspepsia, and the results have been equally good in these cases as in the secondary forms. Meat powder, indeed, combines in itself all the requisites of a nitrogenous food for dyspeptics. The

meat is finely divided and freed from all waste matter that will resist digestion. It contains a great deal of nutritive material in small volume, representing almost four times its weight of meat.[1]

There are several kinds of meat powder in the market, but they all present more or less the same disadvantages; they have a very disagreeable odor, which makes their direct ingestion difficult, and their prolonged administration almost impossible in spite of all attempts to disguise this odor. Meat powder should therefore be given usually by the œsophageal tube. Docile patients readily submit themselves to this manœuvre, which may, with a little practice, be executed very rapidly; and they seldom have to regret having done so, for meat powder produces excellent results in almost all forms of dyspepsia.[2] As a rule a certain amount of an alkali, having relation to the chemical type of the dyspepsia under treatment, is added.

The researches which we have made in company with Rémond, in Debove's laboratory at the Hôpital Andral, have made clear to our comprehension the mechanism of this beneficial action. The prepared meat powder exerts an extremely feeble irritant action upon the gastric mucous membrane; in some individuals the amount of hydrochloric acid excreted in a given time is much less with meat powder than with bread, and when alkalies have been added this small quantity of acid is easily saturated, so that it would appear that gastric digestion is almost completely suppressed. This has a tendency again to reduce the excitation of the mucous membrane of the stomach. The administration of milk habitually combined with meat powder furnishes a diet that procures the greatest amount of repose for the stomach; this effect is the opposite to that attributed to kephir.

Meat powder then is digested especially in the intestine

[1] Yvon: "On Meat Powders," Bulletin de Thérapeutique, January 15th, 1884.

[2] G. M. Debove and Rémond (of Metz): "Lavage of the Stomach," Bibliothèque Médicale, p. 191 *et seq.*

by means of the pancreatic juice, and it is well digested, as the increased weight of the patient and the greater excretion of urea bear testimony.

When it is to be given by the tube the meat powder ought to be beaten up with water, milk, or bouillon into a paste thin enough to pass readily through the tube without clogging it. To accomplish this we must proceed slowly at first, rubbing up the powder with the fluid in a bowl, breaking up the little lumps with a spoon; as soon as all the powder has been thoroughly moistened the rest of the fluid may be poured on more rapidly.

The following is the method of Dujardin-Beaumetz for making fresh meat powder: Take raw meat pulp, or that made from meat cooked in a water bath, and dry it; when it is thoroughly dried and yellow, pass it twice through a coffee-mill, the machine being screwed up the second time so as to grind very fine. Powder thus made has a pleasant odor of roast meat and an agreeable taste. Milk powder has been prepared in the same way by Debove, but the results are not as good as those obtained with powder of meat.

This same principle of the minute division of alimentary products has been applied to the starchy foods. Farinas of all kinds—peas, lentils, beans, rice, etc.—are on the market. Many German physicians regard with great favor meal made of oats and barley. These various farinas are often very serviceable, but they should of course be cooked. They are useful in making thick soups or purées, and serve to supply the deficiency in carbohydrates which exists when meat powder and milk are given exclusively. They may be introduced into the stomach through the tube at the same time as the meat powder, but this mode of administration is less often necessary for the farinas than it is for meat powders.

The famous "revalescière," a preparation in vogue in France, owes its success to the application of this principle; and it is said also to owe it furthermore to the fact that it is made of lentils and other starchy grains in process of germination and therefore contains diastase, which

diastase favors the transformation of amylaceous substances into glucose; advantage is thus taken of a sort of digestion due to germination. The attempt has been made to take advantage of the same fact in the employment of malt, a product of germinated barley. The use of these farinas made from germinating grain is sometimes very advantageous, but they must be given with caution because of the readiness with which they undergo acid fermentation in the stomach when there is a certain degree of alimentary stasis.

German physicians speak highly of soups made by prolonged boiling of barley, oats, or rice. The glutinous substance which is thus formed is thought to have the property of furnishing a sort of protecting covering to the mucous membrane of the stomach. This is the theory, but whether it is correct or not the practical results are said to be excellent. These preparations are, however, contra-indicated when there are acid eructations, pyrosis, or painful gastric spasms (Boas).[1]

Vegetarian Dietary.—The following are the rules laid down by Dujardin-Beaumetz:[2] "The patient must live exclusively on eggs, starchy foods, green vegetables, and fruits.

"A. Eggs under all forms, boiled, scrambled, omelettes, etc.

"B. The starchy foods must be in the form of purées, as mashed potatoes, beans and lentils, racahout, farina with milk, chocolate, 'revalescière,' farina, rice, barley, maize, and oatmeal gruel, bread soup, rice in all forms, various food pastes, noodles, and maccaroni.

"C. All the green vegetables are allowable; purées of carrots, turnips, etc., cooked salads, spinach, etc.

"D. The fruits should be stewed; pastry is permitted.

"Bread is also allowed. As a drink beer may be taken or extract of malt diluted with Alet water or with milk. Undiluted wine and liquors are forbidden."

[1] "Diät und Wegweiser für Magenkranke."

[2] "Traitement des Maladies de l'Estomac," p. 140.

The so-called vegetarian diet is therefore a rather varied one; it is a mixed diet from which meat is excluded. If care is taken to give only vegetables which are cooked and mashed or in thick soup, and to proportion the different elements according to the needs of the case, this régime may be productive of excellent results in certain neurasthenics who have been living on a too rich or too nitrogenous diet, and in nervous dyspeptics who are troubled with obstinate constipation. Baredet[1] says it is very useful in cases of hyperchlorhydria. In the cases upon which he based his observations there was doubtless a very slight degree of hyperacidity not due to hypersecretion and unaccompanied by permanent stasis, for in such a condition starches are digested with difficulty by the stomach because of the excessive amount of hydrochloric acid present; they simply remain there and swell up. When the green vegetables remain in the gastric fluids they increase still more the irritant action of the latter upon the mucous membrane of the stomach. In our own experience the vegetarian diet is very badly borne in cases of continued hypersecretion of hydrochloric acid with stagnation of the contents of the stomach. This diet is indicated rather in cases of organic hyperacidity without pronounced gastric stasis, but even then it ought to be begun gradually; in proportion as improvement takes place starches in the form of gruel or thick soups, and finally green vegetables, may be added to a diet of milk and eggs as a basis. On the other hand, starches and green vegetables may form the main part of the diet in patients in whom intestinal atony and constipation are the predominant symptoms.

Various Cures.—The grape cure is practised especially in Germany and Switzerland. It is also employed in a few places in France, but its application might be greatly extended. The grapes should be eaten from the vine; and perhaps the climato-therapeutic element, the "country cure," is more important than the grape cure itself. The grapes should be fully ripe and should not have too thick

[1] Société de Thérapeutique, November, 1892.

skins; in any case the latter should be rejected as well as the seeds. Patients begin by taking one or two pounds a day, increasing the amount gradually to ten or twelve pounds. At the beginning the patients usually suffer from symptoms of over-repletion of the stomach and intestines, from indigestion and slight purgation. During the cure a light diet is prescribed. The grape cure seems to be adapted especially for plethoric individuals who have a tendency to obesity and at the same time suffer from constipation.

The whey cure resembles in general the grape cure. Whey, like grape juice, contains sugar, albuminoid substances, and salts, but in much larger quantities. It is quite often used in Switzerland and Germany. It produces in general about the same effects, and consequently the indications for its employment are the same as those for that of the grape cure.

Beverages.—The question of beverages is of great importance in the treatment as well as in the etiology of dyspepsia. Unfortunately we have to rely much more upon theory than upon actual, definite, scientific facts in the determination of the rôle which they play in these two respects.

Alcohol.—What is the influence which alcohol and alcoholic beverages exert upon digestion? How far can we permit their use, and under what form, in cases of dyspepsia? The older writers were divided on this point. Some held that alcohol increased the secretion of gastric juice, and favored digestion; others, among them Claude Bernard, believed that this was the case only with small quantities and with drinks containing a small proportion of alcohol; others again looked upon alcohol as always injurious. Researches looking to the solution of this problem have been made recently, but only in a qualitative way, and the conclusions arrived at by different investigators are still contradictory. Gluzinski[1] divides the effect

[1] "Ueber den Einfluss des Alkohols auf die Functionen des menschl. Magens" (Archiv für klinische Medicin, vol. xxxix., p. 405).

of alcohol upon gastric digestion into two phases: in the first the process of digestion is suspended by reason of the presence of the alcohol and of its restraining action on pepsin; in the second, when the alcohol has disappeared, there is an exaggerated secretion of hydrochloric acid which may be in two or even three times the normal amount.

Wolffhardt holds[1] that cognac in small quantity retards the digestion of starches and suspends it entirely when taken in larger amount. When given largely diluted he believes that it hastens the digestion of albuminoids, but suspends it when given in larger doses. Klemperer,[2] in opposition to Gluzinski, maintains that the motility of the stomach is increased rather than its secretion.

That which takes place in alcoholic gastritis—which is in reality a rather complex condition in which gastritis and a toxic neurosis each play its part—can hardly give us much information as to the physiological rôle of alcohol; sometimes, indeed, there is an increase in the secretion of hydrochloric acid and sometimes a diminution (Hayem, A. Mathieu). We do not know whether an increased secretion does or does not always precede the diminished secretion; we do not know whether all individuals do or do not react in the same way to the influence of alcohol, as it acts locally in contact with the mucous membrane or constitutionally as a poison in the blood. We must remember also that the researches to which we have referred have to do only with gastric digestion, and we know nothing whatever of the influence of alcohol upon duodenal digestion, which is perhaps more important than the other.

Ought we then to give alcohol to dyspeptics, and if so, in what amount? In any case it should be given in small quantities and well diluted. It should not be taken on an

[1] "Ueber den Einfluss des Alkohols auf die Magenverdauung" (Münchener medicinische Wochenschrift, No. 35, 1890).

[2] "Alkohol und Kreosot als Stomachica" (Zeitschrift für klinische Medicin, vol. xvii.).

empty stomach any more than should any other strong fermented drink. Its use should be forbidden in cases of increased secretion or of evident gastritis, especially in the gastritis and gastro-enteritis of alcoholic origin. Alcohol is perhaps better borne and less injurious when given in the shape of brandy or of rum largely diluted.

Of course all that has been said applies only to the natural alcoholic beverages and not to the manufactured article. Unfortunately it is becoming more and more difficult to obtain genuine liquors, free from all falsification, a fact that is deplorable from every point of view.

Wine.—One of the few points relating to dyspepsia and its etiology upon which everybody is in accord or nearly so, is the injurious action of red wine in most cases. The use of red wine ought to be suspended or even definitely abandoned in all cases of dyspepsia of even moderate intensity. It is often sufficient to vary the beverage in order to obtain a notable improvement. On the other hand, all forms of treatment are often of no avail unless the use of red wine is forbidden. It is possible that this injurious action of red wine is to be attributed especially to its acidity (5 or 6 parts per 1,000).

White wine, especially when diluted with water, may often be substituted with advantage for red wine. It ought, nevertheless, to be taken in very moderate quantity.

Beer.—When it is agreeable to the patient beer may be, in like manner, substituted for red wine. A very light beer, weak in alcohol, should be selected or else a heavier beer should be diluted with water.

Table Waters.—Pure water of good quality is the best of beverages. It has only one disadvantage, and that is that persons accustomed to the taste and to the stimulation of fermented beverages do not take readily to the exclusive use of water. Table waters[1] are those which contain little or no mineral matter. Their special advantage lies in their bacteriological purity. The presence of alkaline salts and of a more or less considerable amount of carbonic acid

[1] C. Paul and P. Rodet: "Les Eaux de Table," Paris, 1892.

gas imparts to some of them an agreeable flavor. They increase the appetite in a moderate degree, and perhaps also the gastric digestion. It is not always well to use the natural gaseous waters continuously for a long period, and this applies with even more truth to the artificial gaseous waters. They may, however, be given with advantage for more or less prolonged periods, in cases of atonic nervous dyspepsia of moderate intensity, as this is an excellent means of stimulating both appetite and digestion. Care must be taken that these waters are not drunk in excessive amount, as they are then liable to prove injurious.

Hot Drinks.—While not in favor of restricting all fluids, I am, nevertheless, convinced that the amount of liquid taken ought, in many cases, to be very much reduced, and I am in the habit of effecting this by instructing the patients to take only hot beverages. This is a practice which I have borrowed from Germain Sée, and I have almost always had cause to congratulate myself on its adoption.

The drinks are to be taken hot during meals to the exclusion of every kind of cold drink. The patient should be made to take hot, not merely warm water. Sometimes the addition of an aromatic will make it more acceptable. Hot weak tea, slightly sweetened, is sometimes taken readily; but some people cannot drink it, in the evening especially, as it excites them and prevents sleep. In such cases we may give a weak grog moderately sweetened, made with cognac or rum, which may be previously burned in order to deprive it of its alcohol. Certain infusions may also be used, such as infusion of camomile, of orange leaves, etc., according to the taste of the patient.

Hot drinks appear to us to have several very real advantages. In the first place their exclusive use leads to a diminished ingestion of fluids; secondly, they exert a calming influence on pain, on gastric hyperæsthesia; finally it is probable that they stimulate the gastric movements through a direct irritation of the smooth muscular fibres. Heat, in fact, excites contraction in the smooth muscular fibres in various parts of the body, as is shown, for exam-

ple, in the treatment of metrorrhagia by hot injections; and physiological experience tends to show that heat exerts the same action in the digestive tube.

But, whatever the explanation, every-day experience demonstrates the good effects of hot drinks. We need, therefore, pay but little attention to the theoretical objections which have been raised against their use.

PART III.

TREATMENT OF THE PRINCIPAL CLINICAL FORMS OF DYSPEPSIA AND OF THE MOST COMMON SYMPTOMS OF GASTRO-INTESTINAL DISEASES.

CLINICAL observation, aided by the methods of study which we have indicated above, enables us to recognize numerous symptomatic elements in the various morbid conditions of the digestive tract. We might take up these symptoms one after the other and indicate special modes of treatment which each one would individually demand, but this analytical method would be tiresome and would involve us in a number of useless repetitions; we should lose sight of the whole and become swamped in details. It will be better to consider, not isolated symptoms, but the symptomatic complexus which may be viewed as a whole, constituting thus a clinical form of dyspepsia or a secondary expression of definite diseases or lesions.

The dyspeptic state[1] may be divided into two main categories, according as there is or is not an increased secretion of hydrochloric acid. This exaggerated secretion of the acid of the stomach has received the convenient appellation of hyperchlorhydria. This hyperchlorhydria, when it exists, characterizes a whole series of morbid facts; it is the predominant element in them.

When there is no exaggerated secretion of hydrochloric acid the thing of most importance to be considered is the degree of gastric, or rather gastro-intestinal, motility.

It very rarely happens that the movements of the stom-

[1] A. Mathieu: "Traité de Médecine," vol. iii. A. Mathieu and Rémond (of Metz), Société Médicale des Hôpitaux, 1891–92.

ach are exaggerated; more often the trouble is one of atony, and this motor atony may be coexistent with secretory atony. Various dyspeptic states are characterized especially by nervo-motor atony, with or without a concomitant secretory atony. The latter consists chiefly in a diminished secretion of hydrochloric acid, to which the term hypochlorhydria has been applied.

When the motility of the stomach is sufficiently impaired we have gastric stasis and, in consequence of this stasis and of the reduced secretion of hydrochloric acid, a tendency to abnormal fermentations. Organic hyperacidity more frequently accompanies permanent dilatation.

The painful element assumes sometimes a very great importance, and is occasionally the principal element in certain morbid states of the stomach and intestine; it deserves to be made the subject of a special study in which would figure gastralgia and enteralgia, and gastric and intestinal crises. The medication indicated for these conditions is pre-eminently that which would be sedative in its action upon the tissues of the stomach and intestine.

The treatment of vomiting will be taken up in a separate chapter, and we need offer no apology for devoting a special section to its consideration.

On the side of the intestine we find two great symptomatic complexuses which will be the object of a general study; these two are constipation and diarrhœa.

At the present day we cannot make a complete review of the morbid processes going on in the stomach and intestine without including a study of auto-intoxications, and we shall therefore devote a chapter to gastro-intestinal antisepsis.

It will be more convenient also to group under one heading the treatment of the various hemorrhages of the stomach and intestine.

If now to the preceding chapters we add one on the disorders of the appetite and on aperitive medication, we shall have before us the following table of the chapters which together will form the third part of this work:

Hyperchlorhydria, or excessive secretion of hydrochloric acid.

Atonic nervo-motor dyspepsia, with or without diminished secretion of hydrochloric acid.

Permanent dilatation of the stomach.

Gastralgia, enteralgia, gastric and intestinal crises.

Disorders of the appetite, aperitive medication.

Constipation.

Diarrhœa.

Gastro-intestinal antisepsis.

Hemorrhages from the stomach and from the intestine.

This scheme is based entirely upon pathological physiology and semeiology, and takes no account of the presence or absence of any anatomical lesion. We have been forced to adopt this division for the reason that in many cases there is nothing more difficult than to decide whether, to take an instance, there is or is not gastritis present, whether the gastritis is or is not the primary cause of all the trouble, or whether a previously existing neuropathic condition may not be responsible for everything.

As we go along we shall take account, as far as may be necessary, of the bearing which the pathological anatomy of each condition may have upon its treatment, but in the present part of this work we shall not have to concern ourselves much with this question.

We shall also treat in detail in this section of the therapeutics of what was formerly called essential dyspepsia. Furthermore, the previous consideration of the treatment suitable for the various dyspeptic symptoms will enable us to shorten considerably the chapters relating to the actual diseases of the stomach and intestine, in which we shall find again these same symptomatic elements; but in these chapters we shall come across another factor, the lesion, which may be of more importance in the pathological ensemble than its dependent dyspeptic condition. In the case of cancer of the stomach, for example, the cancerous lesion itself is of much more importance than the

diminished secretion of hydrochloric acid or than the reduced motility of the stomach. Nevertheless this is of more value in the way of prognosis than as regards treatment; the therapeutic indications derived from a symptom or from a collection of symptoms remain the same in morbid conditions of very diverse origin and nature.

CHAPTER I.

HYPERCHLORHYDRIA.

Definition.—Hyperchlorhydria is an excess of hydrochloric acid in the gastric juice; it is not a disease, but is merely a symptom common to different gastric conditions. Nevertheless, in a certain number of cases this increased amount of hydrochloric acid is the most prominent symptom, one which serves justly to designate the entire morbid state. The time when the acid is excreted and its amount determine special clinical forms.

We must distinguish three principal varieties:

1. Hyperacidity occurs only during digestion, and is absent when the patient is fasting.

2. Hyperchlorhydria appears in attacks, like gastric crises or fits of migraine.

3. It is accompanied by hypersecretion and by dilatation of the stomach, and this continuous hypersecretion takes place equally during fasting and after meals (hyperchlorhydria with continuous hypersecretion, Reichmann's disease.)[1]

The terms by which it has been proposed to designate hyperchlorhydria and the various clinical types under which it presents itself ought to be mentioned here. Under the pretext of making things clearer, writers have complicated what is in reality very simple. Hayem proposes the term hyperpepsia, which is incorrect, since what characterizes this state is the excess, not of digestive labor, but of the chlorine element, especially as it exists under the form of hydrochloric acid. Albert Robin pro-

[1] Bouveret and Devic: "La Dyspepsie par Hypersecretion Gastrique," 1892.

poses the still worse name, gastric hypersthenia.[1] He ought to have called it at least "secrotory hypersthenia," which is needlessly longer than hypersecretion. He distinguishes among the acute forms the following varieties: 1. Acute paroxysmal hypersthenia of neurotic origin. 2. Acute intermittent hypersthenia of central origin. 3. Acute hypersthenia of direct origin, that is to say, gastric or reflex. He considers only the acute forms.

We shall study the second variety, the crises of hyperchlorhydria, when treating of gastric crises, to which a special chapter will be devoted. We shall consider then here only intermittent, digestive, and simple hyperchlorhydria and hyperchlorhydria with continuous hypersecretion (Reichmann's disease).

Simple Hyperchlorhydria.—In the normal condition the acidity of the stomach during digestion does not exceed at the most 1.80 to 2 per 1,000, but in cases of hyperchlorhydria it may reach even 3 or 4 parts per 1,000. That which characterizes hyperchlorhydria is that this hyperacidity is due to an excess of hydrochloric acid, either free or combined. We may find, for example, a total of 3 to 3.50 parts per 1,000 of free and combined hydrochloric acid. This total of free and combined acid is what Hayem and Winter call chlorhydria; the expression is convenient and useful.

The patients often present symptoms very similar to those of simple nervo-motor dyspepsia, such as weight and a feeling of malaise after eating, flatulence, regurgitation, constipation; but they have a tendency to suffer, more than nervo-motor dyspeptics, from pain coming on from three to five hours after meals. Nevertheless, in simple intermittent hyperchlorhydria the stomach empties itself completely of its contents in the intervals between meals, and there is neither continuous hypersecretion nor permanent stasis.

Simple hyperchlorhydria may be met with in numerous morbid states, in neurasthenics and neuropathics of vari-

[1] Bulletin Médical, February 26th, 1893.

ous orders, in chlorotic individuals, and in those given to the abuse of alcohol; in gastritis more rarely, exceptionally indeed; in cancer of the stomach, etc. Finally, it probably constitutes in many cases the first degree of continuous hypersecretion.

Continuous Hypersecretion.—This condition is characterized, as its name would indicate, by an exaggerated and continuous secretion of gastric juice containing an excessive proportion of hydrochloric acid. This acid is combined with the albuminoid substances that it meets with in the stomach; it is free when it finds none of these substances with which to combine. This is a matter of slight importance, and no useful purpose is served by distinguishing different varieties according as the hydrochloric acid is free or combined. At an advanced period of the disease, when the glandular lesion has progressed sufficiently, hypersecretion persists, but the hyperchlorhydria disappears or sensibly diminishes. We may then find an exaggerated amount of fixed chlorides in the gastric juice, which are secreted without doubt by the mucous membrane become incapable of elaborating hydrochloric acid. The accentuated cases of continuous hypersecretion, called Reichmann's disease after the author who first clearly described it, are accompanied by dilatation of the stomach and permanent stagnation of its contents.

Examination of the stomach while the patient is fasting, even in the morning, shows the presence in it of a liquid containing débris of food, especially of bread and of starchy substances, strongly acid and giving in very marked degree the reactions of free hydrochloric acid. Patients who still have an appetite suffer from severe pains in the stomach for quite a while after eating; these pains, which are often very intense, sometimes end in an attack of vomiting. Sufferers from this trouble become emaciated although they often eat an abundance of food.

Most of the phenomena observed in this disease can be explained by the continuous presence of hydrochloric acid and its irritating action on the gastric mucous membrane.

Nitrogenous food is well borne, and the pains cease during its digestion by reason of the temporary saturation of the hydrochloric acid, but they reappear as soon as the latter is found again in excess, to cease finally when it is rejected by vomiting or once more saturated. Starchy substances are very badly digested, for they simply swell up and remain in the dilated stomach, a fact which furnishes an imperative indication in regard to the dietetic management of these cases.

Dilatation of the stomach may depend upon various causes, such as spasm of the pylorus due to the irritation of a hyperacid gastric juice, nervo-motor atony of neuropathic origin, the accumulation of fluid and of undigested particles of food, and finally gastritis either primary or secondary.

What is the nature of hyperchlorhydria? This is a question which is still the subject of much controversy and which we cannot stop to discuss at length in this place. The affection has been seen to occur in neuropathic individuals as a consequence of some powerful emotion, and in tabetic subjects at the moment of the occurrence of gastric crises. On the other hand gastritis has always been found at autopsy, but we must remember that we have no accounts of autopsies made at an early period of the complaint. The neuropathic element exists beyond question in many cases, but the presence of gastritis has been observed in certain cases followed by autopsy; may it not be that there are instances of hyperchlorhydria due wholly to a neuropathy with gastric determination, and others due exclusively to gastritis (acid catarrh of Jaworski)? This is a question which is impossible of solution with the data at present in hand, and fortunately it is one of little importance as far as the matter of treatment is concerned. Nevertheless it is very probable that all cases of continuous hypersecretion with permanent dilatation end finally in gastritis, as we might presume they would in consequence of the irritation of the gastric mucous membrane by a superacid liquid. We are inclined to believe that there is

very often at first simply a neuropathic hypersecretion which terminates in true inflammation; this is the mixed neurosis of Rémond. At all events, simple hyperchlorhydria, if it persists long enough, is almost certain to pass into continuous hypersecretion, and continuous hypersecretion ends in gastritis. This inflammation gives rise to simple ulcer, a frequent complication of hyperchlorhydria, and it leads as its final stage to destruction of the glandular structure of the stomach and to incurable dilatation.

Continuous hypersecretion is therefore a very grave disease, incurable when it has once become pronounced and inveterate, and our efforts must consequently be directed to prevent its passing into the chronic stage. Treatment of simple hyperchlorhydria should therefore be instituted at the earliest possible moment and should be methodical, active, and persistent.

Diagnosis.—A positive diagnosis of hyperchlorhydria cannot be made without a chemical examination of the gastric juice, but nevertheless certain clinical signs, taken in connection with the happy effect of diet and of a suitable medication, may render the existence of the condition highly probable.

In this affection we find pain coming on some time after the ingestion of food and relieved by the taking of fluids, food, or alkalies. Albuminoid substances are better borne than the starches. In continuous hypersecretion, on the other hand, the pains are more intense and are often followed by vomiting. They frequently come on during the night and wake the patient. The stomach is dilated and is found to contain liquid even when the patient is fasting. The sufferers from this condition emaciate, and sometimes even become cachectic in appearance, although they have preserved their appetite and may even eat excessively. The urine of those suffering from simple hyperchlorhydria, who are well nourished, is rich in urea. The occurrence of hematemesis may indicate the supervention of simple ulcer, a complication, as we have said above, of hyperchlorhydria.

All these symptoms may, however, prove deceptive, and several times we have found diminished secretion of hydrochloric acid with organic hyperacidity when we had, from the symptoms alone, diagnosticated hyperchlorhydria. In certain patients there is a true hyperæsthesia of the gastric mucous membrane, and the contact of a relatively small quantity of organic acids may give rise to phenomena precisely like those caused by the presence of hydrochloric acid in excess. On the other hand there are cases of latent hyperchlorhydria, in which we may find an excess of hydrochloric acid when the clinical signs would point rather to an insufficient secretion of this acid.

A chemical examination of the gastric juice should, therefore, be made whenever possible, for hyperchlorhydria is a sufficiently serious disease with a sufficiently grave prognosis to render this examination well worth while. When it cannot be made we must be guided by the clinical signs and the results of an examination of the urine in instituting a tentative treatment.

We may mention, in concluding this summary of the pathology and diagnosis of hyperchlorhydria, that Bouveret and Devic have found tetany to be more often a symptom of this condition than of any other.

Treatment.—The therapeutic indications are easily deduced from what we have learned of the nature of hyperchlorhydria and of continuous hypersecretion; and here again we can hardly separate the two conditions. We must—

1. Diminish the causes leading to secretory stimulation of the gastric mucous membrane.

2. Saturate the acid present in excess and, if possible, restrain its production so as to spare the mucous membrane from the irritation resulting from its contact.

3. Prescribe the diet best suited to the chemical condition of the stomach.

4. Combat the phenomena of gastro-intestinal atony, when they exist.

5. Reduce the pain by remedies directed against it alone,

when it is not alleviated by the treatment indicated for the hyperchlorhydria.

We shall consider now what are the hygienic or medicinal remedies proper to meet these indications.

1. Diminution of the Causes of Secretory Excitation of the Gastric Mucous Membrane.—These are direct and indirect. By direct causes we understand those which may produce an immediate local stimulation of the stomach; by indirect, those which act through the nervous system by provoking reflexly an increased secretion from the gastric mucous membrane.

The causes of direct irritation are numerous. The mucous membrane of the stomach may be mechanically irritated by coarse food or by food which is insufficiently divided or improperly masticated. In certain patients the only cause which can be found for hyperchlorhydria is insufficient mastication (Bouveret and Devic, A. Matthieu). The question is often, it is true, very complicated, as is everything relating to biology. For example, persons who masticate badly are often forced by the nature of their occupations to eat their food very rapidly; or they are so overworked and worried that they become neurasthenic. Sometimes people who eat too rapidly without properly chewing their food are already neuropathic subjects, who lack method in taking their meals just as they do in everything else. Finally, insufficient mastication is accompanied by insufficient secretion of saliva, and certain experiments seem to demonstrate very clearly that the presence of saliva is necessary to the proper performance of the digestive functions of the stomach.

The substances which are capable of irritating the gastric mucous membrane are exceedingly numerous, and we shall mention only the chief of them: alcohol, strong liquors, spices and condiments of all kinds, and many drugs such as the iodides, bromides, ferruginous salts, naphthol (Hayem), etc., etc. We may perhaps include in the same category the toxic alkaloids of animal or vegetable origin, whence the injurious effect of high meats,

strong cheeses, and the like. Acids, mineral or organic, may have the same injurious effect, even those secreted by the stomach itself, and it is easily imaginable that the irritation of the hydrochloric acid present may, acting in a vicious circle, provoke an increased excretion of the same acid. All individuals are not equally susceptible to the injurious action of these irritants, and in certain cases there seems to be an actual predisposition to overstimulation of the stomach; we might well conjecture whether this predisposition is not, in many cases, both the consequence and the expression of a peculiar state of neuropathic irritation. We must admit indeed that lively emotions, disappointment, mental preoccupation, and intellectual overwork, are often the cause of an attack or of an exacerbation of hyperchlorhydria. The gastric crises in locomotor ataxia are accompanied now and then by an increased secretion of hydrochloric acid, as may be shown by an examination of the contents of the stomach at such times. We occasionally see the symptoms of neurasthenia and of hyperchlorhydria develop simultaneously, and it would be difficult to determine which is the primary condition.

We can readily understand how the simultaneous action of these different factors may intensify the effect, and how much more exposed to hyperchlorhydria may be the neuropathic, the gouty, the neurasthenic when the gastric mucous membrane is subjected to repeated chemical or mechanical irritation (as by alcohol, for example), or when they themselves are subjected to influences likely to increase their nervous condition, such as intellectual overwork, great disappointment, undue solicitude about health, financial matters, and the like. It is evident then that our first object must be to suppress as far as possible all causes of irritation, direct or indirect. When we come to treat of diet we shall show how to reduce to a minimum irritation of the stomach from food.

According to the degree of the disease it will be proper to take the patient away more or less from his habitual preoccupations. All possible causes of cerebral fatigue or

of mental distress must be suppressed. In grave forms of the disease, in cases of continuous hypersecretion, with a tendency to cachexia, the patient ought to give up his business entirely and to seek absolute repose, if not in bed, at least in his own room. The latter is all the more necessary since we are often obliged to prescribe a dietary which would be insufficient for a man in active life. It is a particularly delicate task for the physician to induce the patient to seek this physical, mental, and moral repose, and it will often require the exercise of much tact to accomplish it. He must gain the entire confidence of his patient and appreciate thoroughly all the conditions of his life, from a moral as well as from a material point of view.

2. Saturation of all Acid in Excess and, if possible, Restriction of its Production.—The action of a liquid overcharged with hydrochloric acid is certainly injurious to the gastric mucous membrane. Pain felt by patients several hours after digestion, when there is no liquid in the stomach to dilute the hydrochloric acid or nitrogenous substances to saturate it, is certainly due to this cause. The irritation arising from this permanent contact may in the end cause gastritis and round ulcer. Furthermore, although in general nitrogenous substances are readily digested in surroundings so rich in hydrochloric acid, and doubtless also in pepsin, it is not the same with starchy substances, which in an acid medium would be no longer normally influenced by the saliva. They swell up and are in part retained in the liquid which remains in the dilated stomach, and they often give rise to fermentations which add an organic hyperacidity to the hyperchlorhydria already present.

But this is not all, for it is probable that the hyperacid wave of fluid from the stomach which is poured out into the duodenum interferes with intestinal digestion. Patients with hyperchlorhydria are then really deprived of carbohydrates, whence their emaciation, in spite of their appetite which is sometimes excessive. The object of the physician is, therefore, to saturate this injurious excess of

hydrochloric acid and to restrict its production. It is much more easy to meet the first indication than the second.

Antacid Medication.—Nitrogenous foods, milk especially, contribute in large measure to the saturation of the acid in the stomach, and consequently to the protection of the mucous membrane against its own secretion. But they do not suffice, for as soon as they are digested the hydrochloric acid becomes again free and ready to work mischief. Now we can neither multiply indefinitely the number of meals nor give milk in unlimited amount to patients who have or who will have gastric dilatation and stasis. We are obliged, therefore, to have recourse to alkalies to saturate the excess of hydrochloric acid. We may even, when the patients are fed exclusively on milk and meat powder, as Debove has proposed, endeavor to suppress completely gastric digestion. This indication is very clear when there is an ulcer present or threatening. On the other hand, we must not continue indefinitely the administration of alkalies in large doses. They are indicated only when pain exists that does not yield to the ingestion of food. Whenever possible the use of alkalies should be temporary or at least intermittent.

We must see first how much acid there is that needs to be saturated, and we shall show then by means of what alkalies, and in what doses employed, we may attain this end. We do not yet know exactly how much gastric juice the stomach of man secretes.

"A dog weighing 18 kilogrammes," says Béclard, "gave us an average of 72 grammes of gastric juice an hour. The quantity of gastric juice secreted in the human being has been estimated by Bidder and Schmidt, in the case of a woman having a gastric fistula, at more than 500 grammes an hour. Taking into consideration the difference in weight, we have here nearly the same proportion as in the case of a dog."[1] Assuming that this secretion is continued in the same proportion for three hours only

[1] Béclard: "Traité de Physiologie," 7th edition, vol. i., page 90.

after each meal, we should thus have four or five litres of gastric juice; and on these figures Debove has based his treatment of round ulcer by alkalies in large doses.

In the case of an acidity of 3 parts per 1,000, an amount that is often surpassed in hypersecretion of hydrochloric acid, we obtain figures much higher than would *a priori* be supposed, that is to say, 12 to 15 grammes at least of hydrochloric acid which we should have to saturate in order to render the gastric juice neutral.

Taking the chemical equivalents we find that to saturate 1 gramme of hydrochloric acid we require 1.48 grammes of bicarbonate of soda, so that from 20 to 25 grammes of bicarbonate of soda would not be too much. But as this salt has certain disadvantages, and as 25 grammes of bicarbonate of soda would be disposed of with difficulty by certain patients, experiments have been made to determine whether it would not be better to make use of other alkaline bases.

Boas,[1] taking as a starting-point these chemical equivalents, has compared calcined magnesia and ammonio-magnesian phosphate to bicarbonate of soda. One part of calcined magnesia and two parts of ammonio-magnesian phosphate correspond to four parts of bicarbonate of soda. According to this a mixture containing one part of calcined magnesia and two parts of ammonio-magnesian phosphate would correspond to eight parts of bicarbonate of soda, and if to this mixture we add four parts of bicarbonate of soda we obtain the equivalent of twelve parts of the soda salt. One disadvantage of this substitution is that neither the magnesia nor the ammonio-magnesian phosphate is soluble in water. But we have a number of times employed successfully mixtures similar in composition to those above mentioned.

The calcined magnesia would be especially indicated in cases in which there is a tendency to constipation, or, by reason of its great absorbent power, in cases in

[1] "Allgemeine Diagnostik und Therapie der Magenkrankheiten," 1890.

which there is an undue amount of gas in the stomach and intestine.

As to ammonio-magnesian phosphate, Hayem justly remarks that he does not know the effect which its prolonged administration would exert upon the gastric mucous membrane.

These three substances are, however, not the only ones which may be used. We may employ various other salts of soda, potassium or lime salts, other kinds of magnesia or subnitrate of bismuth.

Sodium Salts.—The bicarbonate is by far the most frequently prescribed salt notwithstanding its few disadvantages. Its taste renders it disagreeable to certain individuals; it is not often, however, that we have to abandon its use on that account. It may be given in water, in milk, or in wafers. Upon coming in contact with a hyperacid gastric juice it may give rise to an abundant formation of carbonic acid, producing thereby a disagreeable tympanism of the stomach or even, as I have seen, an actual sensation of suffocation. Certain patients, when under the influence of large doses of bicarbonate of soda, suffer from pains in the kidneys and from irritation of the bladder. There is nothing very serious in that, however, and we are no longer in dread of the alkaline cachexia with which Trousseau and Pidoux have frightened physicians of former days. Nevertheless we may find ourselves obliged to discontinue the use of the bicarbonate and to have recourse to other alkalies.

Rabuteau has urged the adoption of the sesquicarbonate, but has not succeeded in dethroning the bicarbonate.

Many other salts of soda, for example, the benzoates, the lactates, the malates, etc., might, without doubt, be substituted for the bicarbonate and might have, in certain cases, special advantages of their own. Thus, the benzoates might be employed when fermentation was present, or the lactic acid of the lactates might have a useful action in certain cases. These are, however, merely hypotheses which must be verified by clinical experience.

In concluding this enumeration of the sodium salts we must not omit the mention of medicinal soap or almond soap with sodium base. It has been prescribed by Senator in pill form with a view of alkalinizing the intestinal juice (Hayem).

Potassium Salts.—These salts are not much employed in France, as their toxic action is feared, especially their toxic action upon the heart. However, many authors speak well of liquor potassæ and suggest that it might be employed with advantage. It is made in such proportion that one part of the solution contains .085 part of potash, so that 15 grammes of liquor potassæ would be required to saturate 1 gramme of hydrochloric acid. To saturate the amount of acid present in hyperchlorhydria we should require from 15 to 20 grammes of potash, that is to say, 200 to 300 grammes of liquor potassæ, an amount which it would be evidently impossible to give. So that although this preparation might be useful in other conditions when alkalies in small dose are indicated, it is of no service when it is desired to give large doses of an alkali.

Calcium Salts.—These salts have been used for a long time in the treatment of diseases of the stomach. Lately Germain Sée has recommended especially the chloride and the bromide.[1]

Lime water is frequently employed; this is a saturated solution, which contains, however, only 1.28 grammes of lime per litre. Referring again to the chemical equivalents, it is easy to calculate that one litre of lime water would saturate hardly more than one gramme of hydrochloric acid. As an equivalent, therefore, of the 20 to 25 grammes of bicarbonate of soda given by Debove in round ulcer we should have to administer more than 10 quarts of lime water a day. Nevertheless, this water produces excellent effects in hyperchlorhydria and in simple ulcer. As it is given only in moderate doses (100 to 200 grammes on an average), it is evident that there is some other element than its alkalizing power upon which its favorable

[1] Académie de Médecine, March 8th, 1892.

action depends. It is probable that its good effects are due to the rôle that lime plays in the coagulation of milk in the presence of the gastric rennet; it is possible also that it exerts a sedative effect upon the mucous membrane of the stomach. Lime water goes naturally, therefore, with milk, to which it is added as a matter of routine.

Lime may be dissolved in sweetened water in a much larger proportion than in pure water; this is probably due to the formation of a saccharate. Use has been made of this property to administer lime in a more concentrated form than it is in lime water. Trousseau used to give from 1 to 2 grammes of saccharate of lime to children and from 5 to 10 grammes to adults. Debove has also placed saccharate of lime among the remedies which may be used to render the gastric juice neutral.

Carbonate of Lime.—Powdered crab's eyes and prepared chalk were much employed in former times, but at present we use only prepared chalk obtained by precipitation. The latter is often mixed with bicarbonate of soda, but this mixture should be very perfectly made if we would avoid the possible production of concretions in the intestine.

Mode of Administration of Alkalies.—As a general rule, when alkalies are to be given in the treatment of hyperchlorhydria, they should be administered some time after meals and just before the period at which the gastric pains ordinarily appear. They may be given in divided doses in such a way as to saturate the hydrochloric acid in proportion as it is being produced. In this way also we are constantly replacing in the stomach the alkaline bases which may have been washed out through the pylorus or have been absorbed; we neutralize the hydrochloric acid at the very moment that it is in excess, at the moment that it is no longer chemically masked by the albuminoid substances in process of digestion. If it is found desirable to administer alkalies during a meal they should be taken strongly diluted, under the form of Vichy or Vals water, for example.

The amount of alkalies given should be in proportion, as far as possible, to the absolute quantity of hydrochloric acid secreted by the mucous membrane of the stomach; a smaller dose is therefore indicated in simple hyperchlorhydria than in hyperchlorhydria with continuous secretion. It will not be so very difficult to determine approximately the proper amount of alkali if a chemical examination of the contents of the stomach has been made. The pain is an excellent guide in this respect, for it ought to be entirely subdued by alkalies given in a proper way, at suitable intervals and in sufficient doses.

It is a point that would seem to be well established that bicarbonate of soda, given in small doses on an empty stomach, increases the secretion of the gastric juice and the production of hydrochloric acid. The drug ought therefore never to be given in this way in cases of hyperchlorhydria.

A course of treatment at Vichy or Vals may suffice to bring about an amelioration of the symptoms in cases of simple hyperchlorhydria of moderate intensity. The waters should be taken during and after meals, and their action may be increased by the use of the powders obtained by the evaporation of the waters. The patients will at the same time derive the benefits accruing from a climatic treatment.

But in cases of actual hypersecretion there is nothing to be gained by a visit to the Springs, and, as Bouveret and Devic justly remark, they will do much better at their own homes than in a hotel or boarding-house, and will be able to follow more exactly the severe régime that Reichmann's disease demands.

To neutralize the gastric juice and to lessen the effect of its undue richness in hydrochloric acid is well; but it is much better to prevent the exaggerated production of the acid, and to arrest the hypersecretion when it exists. Can we do this; have we any remedies which we can make use of for this purpose?

It was natural to think of atropine, and some authors

have seen good effects from its use. We have employed it several times, but, like Bouveret and Devic, we have never seen it produce any good result.

According to Jaworski, Ewald, and Hayem sulphate of soda has the property of reducing the rate of secretion of hydrochloric acid. Hayem even claims that the use of Carlsbad water may lead to a total disappearance of hydrochloric acid, to anachlorhydria. He gives a small quantity of sulphate of soda, or of Vichy water containing from 4 to 6 grammes of this salt, every morning before breakfast, to patients suffering from hyperchlorhydria.

We must not forget that the most important thing is to reduce to a minimum the direct or indirect stimulation of the gastric mucous membrane. This is perhaps also the best means of diminishing the hypersecretion.

It is quite true that we may, by feeling our way, finally arrive at a successful treatment of cases of this kind; but it is certain that it is much better to base our treatment upon exact data derived from the chemical examination of the contents of the stomach, and to observe its effect by means of examinations repeated from time to time. The dangers resulting from hypersecretion, which menaces all patients with hyperchlorhydria, make examinations of this class well worth the physician's while, especially as they can be conducted with less discomfort to the patient than would be caused by the administration of an emetic. Still, when the patient obstinately refuses to submit to a direct examination we must necessarily grope our way, relying upon diagnostic probabilities.

3. *Diet.*—The question of the alimentary régime of patients with hyperchlorhydria is answered in different ways by different authors. Some, and these are the most numerous, rely especially upon a nitrogenous diet, while others prefer a vegetarian one (Dujardin-Beaumetz, Bardet).

If we consider that patients with hyperchlorhydria as a rule digest meat very well by reason of the habitual richness of their gastric juice in hydrochloric acid and in

pepsin, and that the starchy foods are not completely digested, but merely swell up, and that stagnation with acid fermentation tends to become chronic with them, we are naturally led to put them upon an almost exclusive nitrogenous diet, or in any case one in which the nitrogenous element predominates; and this all the more since the dissolved albuminoids mask and neutralize the hydrochloric acid, forming temporary combinations with it. Dujardin-Beaumetz and Bardet have been led to prefer what they call a vegetarian diet (see above) because of the stimulation to the gastric mucous membrane that meat produces; under its influence there is an exaggerated secretion of the gastric juice. This fact has, indeed, been confirmed by Hayem, who has made some special experiments in this line. The argument has much less importance if we remember that these patients usually receive large doses of bicarbonate of soda, given to combat the effects of the exaggerated secretion of hydrochloric acid.

But in any event the treatment should vary according to the different forms and degrees of hyperchlorhydria.

We must remember in the first place that the strict application of the general rules which we have laid down for the diet of dyspeptics is indicated pre-eminently in cases of hyperchlorhydria. In these cases more than in any others it is absolutely necessary that the food should be finely divided and should contain no indigestible residue; they must avoid irritating dishes of all kinds, spices, alcoholic liquors, red wine, and all fermented articles of food or drink. In special cases it may be necessary also to avoid acids of all kinds and to reduce in large part the amount of fatty substances consumed, because of the stagnation which accompanies the grave forms of hypersecretion.

In cases of continuous hypersecretion accompanying hyperchlorhydria it would be absolutely impossible to put the patient upon a vegetable diet. Bread and the débris of starchy and of green vegetables remain in the stomach and become at once a cause of new irritation and of pro-

gressive dilatation. In such cases the patients often suffer from very severe attacks of pain, ending in vomiting. The most appropriate treatment in the early stages of this condition is a milk diet with large doses (15 to 25 grammes) of bicarbonate of soda or an equivalent amount of some other alkali according to the indications given above. We have said several times that it is better to give the alkaline salt some time after the milk, and the following is our ordinary method of procedure: The patient drinks a pint of milk in the course of fifteen or twenty minutes every two hours; then, an hour or an hour and a half after drinking the milk, he takes a suitable dose of the alkali in a little milk or water or in wafer. The patient takes in this way about three quarts of milk in six or seven doses. It is well to reserve a little milk and a dose of the alkali for the night, as there are often, in these grave forms of hyperchlorhydria, very severe nocturnal attacks of pain. At the same time the patient is kept at rest and if necessary in bed; under these conditions the milk diet suffices, at least temporarily, to maintain the strength.

We may also, if there are no special indications against the passage of the sound, practise gavage with alkalinized meat powder in the same way as Debove does in the case of simple ulcer. We may thus introduce at one sitting, afterward at two, from 60 to 80 grammes of meat powder, the amount being increased later to from 100 to 200 grammes.

At a later period, when a certain improvement has been obtained, when the pains have disappeared, the hypersecretion has diminished, and the stomach in the morning is found to contain a much less quantity of acid liquid, we may try to give a small amount of starchy food; the great difficulty will be, however, to bring the stomach to tolerate it. We can easily give a large quantity of nitrogenous food and, thanks to the milk, a sufficient amount of fat, but it is much more difficult to cause the starchy substances to be well borne and digested.

We may add a certain quantity of lactose, say from 60

to 100 grammes a day to begin with, to the milk; but care must be taken to see that this milk-sugar is well borne and that it does not contribute to increase the gastric acidity by the production of lactic acid. It will be proper later to give well-cooked starchy matters in the form of tapioca, bread, or flour soups made with milk.

Bouveret advises that the starchy foods be given in the morning after the stomach has been washed out. At the same time a dose of bicarbonate of soda may be administered in order to alkalinize the gastric juice and to permit of the action of the saliva. It would be rational in these cases to give diastase, maltine, or maltose. This method is certainly very logical, but there is one objection to it, and this is that it is more harmful than beneficial to wash out the stomach every day in cases of hyperchlorhydria, for it acts as a stimulant to the gastric secretion. As an antiseptic measure it is sufficient to practise lavage two or three times a week, and we might take advantage of these times to administer starchy foods in the manner recommended by Bouveret. We have had no personal experience with this practice, but we have succeeded recently in bringing very marked relief to a patient with stasis by the simple use of milk, lactose, milk soups, and meat powder given through a tube. The patient gained twelve pounds in weight in the course of six weeks, and whereas formerly from 800 to 1,200 grammes of liquid could be collected from his stomach in the morning, now we can get only 100 to 150 grammes.

As the case improves we may give eggs, lightly pulped meat, and finally the various purées, approaching in this way the vegetarian régime of Dujardin-Beaumetz; the latter is, however, an ideal which we can reach only after a considerable time and sometimes without any hope of being able to maintain it for long periods.

Let us see now what is the diet most suitable in a case of hyperchlorhydria of moderate intensity, without continuous hypersecretion or permanent stasis. There will be an acidity of 2 or 3 parts per 1,000 at the end of an hour

after Ewald's test meal (two ounces of bread and half a pint of water or weak tea), with a tendency to an exaggerated secretion of the gastric juice as is shown by the greater quantity of fluid extracted from the stomach in these conditions. As a subjective symptom we see rather severe pain coming on several hours after a meal, especially in the afternoon or more rarely at night. These patients often of their own accord make a lighter meal in the evening than at noon, and it is well to encourage this plan in those who follow it and to counsel it to those who have not yet adopted it. Sometimes there is a slight tendency to flatulence after meals, and constipation is almost always present.

The patients should live exclusively on meat, eggs, fish, dairy products, and mashed potatoes. They ought to eat little bread; from three to five ounces of stale bread a day should suffice. For drink they should take milk or water, the latter pure or alkaline (Vichy or Vals). Hot drinks seem to exert some good effect in reducing the amount of flatulence. As improvement takes place very light beer or beer diluted with water may be permitted. Gradually the attempt may be made to add starches to the diet, as has been said above. In dealing with patients of this class one cannot insist too strongly upon the absolute necessity of abstaining from everything that may irritate the stomach, and especially from alcoholic liquors and red wine. We must not forget that they are constantly menaced by continuous hypersecretion, and that they can avoid it only by minute hygienic precautions observed for a very long period of time. Dyspeptics of this class are often alcoholics; this is an etiological point that we ought not to forget, for it is full of instruction for us from a dietary point of view.

These patients are subject to exacerbations of longer or shorter duration, but in an interval between these attacks it is probable that they would derive benefit from a course of the waters at Vichy or Vals, upon condition, however, that none of the indications before mentioned be disregarded.

We now come to very mild cases of hyperchlorhydria, to those on the border-land between simple nervo-motor dyspepsia and hyperchlorhydria. The vegetarian dietary of Dujardin-Beaumetz might suit these, but these only. They might also derive benefit from a course of alkaline mineral waters, but with the strict understanding that they are not to be taken for sufferers from hyperchlorhydria, for they ought never, for example, to be allowed to drink alkaline waters while they are fasting. They would be helped by a rest in the country, properly regulated walks, freedom from all care, and a very simple diet as free as possible from all stimulating qualities.

Treatment of the Symptoms of Gastro-Intestinal Atony.—This condition is not very uncommon in cases of hyperchlorhydria. Permanent dilatation with stasis is almost of necessity present in severe cases accompanied by hypersecretion when the disease has lasted a certain time. We may ask ourselves whether, in advanced cases, the relaxation of the stomach walls may not be due in great part to the gastritis; yet it is certain, if we may be permitted to judge from the improvement seen in some instances, that the atony often is of great importance at the beginning. Whichever hypothesis may be correct, the course to be pursued remains very nearly the same; we must avoid with the greatest care all overloading of the stomach. It will be hardly possible to overload the stomach when the mode of feeding above indicated is followed out, but in any case there can be no accumulation of indigestible detritus, such as tendinous fibres or fatty cellular tissue derived from the meat, or cellulose, vegetable fibres, or starchy matters in excess coming from the vegetables ingested.

Washing out the stomach from time to time will be of advantage, but this ought not to be done too often on account of its irritating effect upon the gastric mucous membrane.

Meat powder may be given in hot water so as to stimulate the smooth muscular fibres of the wall of the stomach to contraction, but all measures having a tendency to in-

crease the movements of the stomach and intestine should be employed with great caution in cases in which there is continuous hypersecretion; we shall refer to these measures more particularly when we come to treat of dyspepsia resulting from atony. We must not forget that it is necessary to reduce to a minimum everything which may stimulate the mucous membrane of the stomach to still greater secretion in these cases in which hypersecretion already exists.

For the same reason we ought to have recourse to enemata rather than to purgatives in treating the constipation which is very commonly present in patients of this class.

In cases of simple hyperchlorhydria we often see phenomena of flatulence and of atony similar to those met with when this condition is not present. These phenomena may be attacked with more vigor the less pronounced is the hyperchlorhydria, and many of the patients indeed may be put at once upon a treatment directed against the atony.

Treatment of the Pains not Amenable to that directed against the Symptom of Hyperchlorhydria Alone.—In general these pains are relieved by a suitable diet and the administration of alkalies, and when this result is not produced we must see whether it is not because the alkali is given in insufficient dose or at unsuitable intervals after meals. However, there are cases in which we are forced to resort to the administration of gastric sedatives in combination with the alkalies. We shall lay down the rules for giving these remedies in a subsequent chapter, and need not consider the subject at greater length here.

CHAPTER II.

NERVO-MOTOR DYSPEPSIA (ATONIC OR ASTHENIC DYSPEPSIA).

We apply the general term nervo-motor dyspepsia to that form of dyspepsia in which the disturbance of the gastro-intestinal motility, especially atony, seems to be the most important phenomenon. It is also often, but not always, accompanied by secretory atony and diminished production of hydrochloric acid. In typical cases of this variety of digestive trouble, the most prominent symptoms are those due to nervo-motor derangement, which is translated by a tendency to passive distention, atony, of the different segments of the digestive tube. These phenomena are most marked in the stomach and large intestine, by reason of the greater calibre of these parts. According as these morbid manifestations are more marked in the stomach or in the colon, according also to their degree and to the presence or absence of a diminished secretion of hydrochloric acid, we find more or less pronounced clinical varieties.

There is no doubt that there are a certain number of these cases in which a true chronic inflammatory lesion of the digestive mucous membrane is present. Gastritis in particular is very apt to come on in patients of this class in consequence of the disturbance of motility; but when it gives rise to no prominent symptoms or is even unrecognizable it is actually of little importance. There is, indeed, nothing more difficult to diagnose than gastritis and sometimes enteritis; the uncertainty in this regard is so great that clinicians of equal attainments admit or deny the existence of catarrhal inflammation in cases in which

the symptoms are absolutely identical. But, as we have said before, this is of little importance.

To show how much we may be embarrassed in deciding whether the nervo-motor or the catarrhal element is the primary one, let us take, for example, what is called alcoholic gastritis. In some this shows itself by the symptom of hyperchlorhydria, in others by the opposite condition of diminished secretion of hydrochloric acid (Hayem), even when the duration of the poisoning may be unable to account for these opposing facts. Gastritis surely is not the only element present; we know that the entire nervous system is involved and is excited by the action of the alcohol, and that alcoholic subjects are always neuropathic. The dyspepsia from which they suffer is certainly also nervous in large measure, and it is very difficult to determine the particular rôle of these diverse pathogenic elements in the production of the morbid ensemble. We are not even sure of the exact nature of the mucous membrane, and we know that the matter expelled by morning vomiting contains much saliva (Frerichs).

We may then, in a general way, ignore the question of the presence or absence of gastritis in cases of genuine nervo-motor dyspepsia. We have, in the preceding remarks, endeavored to show clearly the signification, especially clinical, which we attribute to this term. Nervo-motor dyspepsia in this sense corresponds in general to what was formerly called flatulent dyspepsia, and also to that form which writers, especially German writers, call catarrhal gastritis.

Germain Sée[1] was the first who definitely isolated this clinical variety of dyspepsia. At one time when chemical researches had not acquired the precision that they have at the present day, he made a distinction between pseudo-dyspepsias of motor origin from true dyspepsia of chemical nature. This view is open to attack, but, nevertheless, under the incorrect term pseudo-dyspepsia he distinguished clearly a symptomatic complex of actual clinical existence

[1] "Des Dyspepsies Gastro-Intestinales."

and of frequent occurrence. He deserves credit also for demonstrating very clearly that the intestine is concerned equally with the stomach in digestive disturbances.

In an article published in the *Revue de Médecine* for 1885, we have taken up with him and carried still further the study of this form of dyspepsia. The researches which we undertook later with Rémond in the service of Professor Debove enabled us to show that chemical examination only confirms the existence and the frequency of nervo-motor dyspepsia [1] with predominating atony.

Hayem gives a very limited place to atonic dyspepsia, but this is because he attributes a great importance to what, in our view, are minute variations in the proportion of free or combined hydrochloric acid. He multiplies chemical divisions without any evident clinical utility. He also forgets that he examines the functions of the stomach only, and does not take sufficient account of the intestine, which is, however, even more important than the stomach in normal digestion and in quite a number of pathological conditions.

Simple nervo-motor dyspepsia, as we understand it, includes the great majority of cases in which there is neither hyperchlorhydria, permanent stasis, nor organic hyperacidity; it represents more than a third, perhaps a half of the cases of dyspepsia.

Patients suffering from the most common form present the following symptoms: More or less immediately after eating they have a sensation of weight at the pit of the stomach and frequently a feeling of suffocation. They are obliged, in order to breathe more easily, to loosen their garments, and often they have eructations of gas, causing much relief. Respiration is difficult, the face is congested; they have a sensation of torpor, of general malaise, and of heaviness in the head. They suffer from somnolence and find themselves incapable of any intellectual labor. The tympanism from which they suffer is often as much intes-

[1] Société Médicale des Hôpitaux, 1891-92. Debove and Rémond, "Lavage de l'Estomac" (Bibliothèque Charcot-Debove).

tinal as it is gastric. The patients are habitually constipated and frequently suffer from hemorrhoids and from muco-membranous enteritis. In some cases these intestinal symptoms predominate and mask those arising from the stomach; at other times there is an alternation in precedence between the gastric and the intestinal manifestations.

These patients are above all flatulent, although this symptom is, in exceptional cases, less marked; the sensation of fulness, of gastro-intestinal distention, is less noticeable, sometimes almost absent. There is after meals a feeling of weight, sometimes even a burning sensation at the pit of the stomach. This is, it would seem, although it is not actually proven, an indication of a tendency to stasis and to secondary or, better, excessive organic fermentation. In rare instances the gastric pain becomes quite intense, and almost always there are cramps or a burning sensation which might almost be characterized as pain. Certain patients, moreover, seem to have a true hyperæsthesia of the gastric mucous membrane, so that a degree of hyperacidity, which would be unnoticed by some, becomes the cause in them of acute pain.

Vomiting is rare; it hardly ever occurs except in patients who have already crossed the border line between simple nervo-motor dyspepsia and that form of dyspepsia with stasis and excessive fermentation which we shall study further on. We must recognize the fact, however, that this boundary line is a movable and uncertain one, and we often see symptoms pointing to stasis and fermentation disappear when the causes of dyspepsia have been removed and suitable hygienic and medicinal treatment has been instituted.

Permanent dilatation is a possible termination of this form of dyspepsia when the causes persist, when the patient has insufficient resisting power, and when gastritis has become actually established.

Sufferers from a mild degree of nervo-motor dyspepsia usually preserve their appetite, but in the more accentuated

forms the appetite may disappear and may even, in the most severe cases, give place to an actual repugnance to food. We sometimes see patients, especially the neurasthenic, fall into an actual condition of inanition and of decline. They emaciate, lose strength and courage, become incapable of any labor, and sometimes even are bedridden. These cases are fortunately rare; their treatment demands the application of the Weir-Mitchell cure, or forced feeding.

Sometimes, as we have said, the intestinal phenomena assume a greater importance than the gastric. Constipation is obstinate and there is frequently a muco-membranous enteritis. We shall devote a special chapter to the consideration of these phenomena. We may mention here only the delayed abdominal pains, veritable colic, coming on several hours after eating; there is a sensation of burning and of griping, following the direction of the transverse colon. These pains are sometimes accompanied by exaggerated peristaltic or anti-peristaltic movements which are visible on inspection of the abdomen. Sometimes, but not always, these painful crises are premonitory symptoms of intestinal involvement, and we may detect, on palpation, signs of temporary or of permanent dilatation of the colon or cæcum.

External examination shows the presence of abdominal tympanism, sometimes generalized and sometimes limited to the stomach or colon. The stomach is distended; its lower limit is not below the normal, but its resonance is perceived over a greater area than usual. Sometimes a succussion sound may be obtained rather far down, but there is no permanent stasis and the stomach empties itself completely in the intervals between meals. Nevertheless, in cases in which atony predominates we may find all the intermediate stages between a distended stomach and a stomach actually dilated, such as we shall describe later.

The giving of a test meal and subsequent examination of the gastric juice will show us that the secretion is normal in a goodly number of cases; but in others we may

find a notable diminution in the quantity of hydrochloric acid. Sometimes even we shall find that the free hydrochloric acid has disappeared and chemical examination will show us that there is an actual diminution in the amount of combined hydrochloric acid, that is to say, there is veritable hypochlorhydria. To arrive at this diagnosis it is sufficient to determine by means of the ethyl-green test the absence of free hydrochloric acid at the same time that there is a weak total acidity, that is, below 1.60 per 1,000. In cases of hyperacidity without free hydrochloric acid a more extended chemical examination will be necessary. However, the presence of an acid odor, sharp and butyric, of the gastric juice, affords a presumption of secondary fermentation of the contents of the stomach.

The main point is that the stomach empties itself well, getting rid of its contents completely, although occasionally less rapidly than the normal organ. When this occurs both time and material are wanting to permit of fermentation taking place in the stomach to such an extent as to become a matter of much importance.

Let us review rapidly the causes of this morbid state. Nervo-motor dyspepsia occurs very frequently in the neuropathic, in actual neurasthenics, in the gouty, the rheumatic, etc., all belonging more or less strictly to the great neuropathic family. It is seen also in the anæmic and the chlorotic, who are also neuropathics, in the first stage of tuberculosis and in various conditions of chronic poisoning.

In the neuropathic we often observe the effect of more or less active intervening causes, such as disappointments, mental emotions, overwork, and the like, or that produced by the ingestion of irritating substances, such as insufficiently masticated food, dishes too highly spiced, and strong liquors, or by overeating. These last-mentioned causes are those to which classical authors attribute the origin of gastritis, especially of catarrhal gastritis; but we have already given our views on this point and have said that the hypothesis of gastritis, even if its presence were demonstrated, would not prevent us from including under this

head cases in which the symptoms observed are exactly those which we have just enumerated.

Before entering upon a consideration of the treatment of this condition we must repeat that we shall concern ourselves solely with the indications furnished by the gastric symptoms, reserving our remarks on the management of constipation and its complications for the section devoted to the treatment of intestinal disorders in general; this division is artificial, but it is necessary to a clear exposition of our subject.

Many different methods of treatment have been employed in the case of nervo-motor dyspepsia, and since this form is the most common and also the most amenable to treatment, the followers of all or nearly all of these methods have been able to point to successful results. This is because it is necessary in most cases only to put the patients under discipline, to give them good advice as to the following out of ordinary hygienic measures, in order to effect a considerable amelioration of their symptoms. Exercise in the open air, the removal of the ordinary causes of fatigue or mental disquietude, abstention from overwork, and the avoidance of habitual overloading of the stomach, usually suffice to restore, temporarily at least, the equilibrium between the functional action of the nervous system and that of the digestive canal. This form of dyspepsia is often relieved by measures directed against the neurasthenia, since it is so frequently dependent upon this neurosis. It yields readily when the nervous state is not too deep-rooted and when it is not complicated by the existence of too powerful hereditary influences.

This explains the success following the application of apparently contradictory measures; it explains also the reputation of certain cures carried out at mineral spas, the waters of which are almost indifferent. Physicians practising at these resorts would render even greater services to their patients if they would but possess themselves more fully of the truth of the principles which we have just laid down. By paying more attention to diet and to hygiene

they would obtain more frequent and more lasting cures. It is deplorable, for example, that patients of this class are often entrusted, as regards their diet, to the mercies of the average hotel keeper and to the traditions of the ordinary table d'hôte.

We shall consider first the ordinary form of the disease and after that the more severe form. Under the first we recognize two varieties, viz., nervo-motor dyspepsia with or without a diminished excretion of hydrochloric acid, and nervo-motor dyspepsia with a tendency to stasis and hyperacidity. We shall point out what are the special indications present in these chemical varieties; but before proceeding to that, we shall examine successively the different modes of intervention which are at our disposal in the management of this affection. We may class these as follows:

(*a.*) Diet.

(*b.*) Climatotherapy (including cures at different mineral springs).

(*c.*) Special manœuvres of a physical nature, such as hydrotherapy, massage, gymnastics, electrization, mechanical support to the abdomen.

(*d*) Medication of the gastro-intestinal atony, with its subdivisions, excito-motor, excito-secretory, and acid.

This classification has, like all other classifications, its advantages and its disadvantages, but we lay little stress upon them, for the classification is of service only in enabling us to introduce a little order in our presentation of the subject. We are ready enough to admit the artificiality in the distinction between an excito-motor and an excito-secretory medication, for example, and we ask no one to attach a greater significance to it than we ourselves do. The fault lies chiefly in the weakness of the human intellect, which is able to grasp questions only as they are presented in successive order.

Ordinary Form.—(*a*) *Diet.*—What we have said of the necessities of diet in cases of dyspepsia in general is applicable to nervo-motor dyspepsia. The régime must be

more or less strict according to the case. Let us consider some of the special indications.

When there is a feeling of weight in the stomach and of uneasiness after eating and heaviness in the head evidently dependent upon the neuropathic state, it is this neuropathic condition with which we must especially concern ourselves. Thus, in the case of neurasthenic patients, run down by excessive work or business cares, it will often be sufficient to withdraw the individual from his habitual surroundings and send him into the country in a neighborhood where tranquillity of mind will take the place of overwork and anxiety, and where mental repose and physical exercise will replace the intellectual overwork, in order to obtain a cure of his dyspepsia. In the case of patients who habitually live too high, who take too much food or food too richly prepared, we must advise a very simple table. It is useless to go into further details, after what we have said concerning the general alimentary hygiene of dyspeptics.

We must never forget that the intestine plays as great a part as the stomach, perhaps even greater, in most cases of painful dyspepsia. The gaseous distention is located as frequently in the bowel as in the stomach; and we often see constipation, alternating or not with attacks of diarrhœa, muco-membranous enteritis, and hemorrhoids. All these symptoms demand at times a special treatment, to a consideration of which we shall devote a chapter in this volume. We must combat the intestinal atony and cure the constipation if we wish to improve the digestion, and hygiene is here as important as medication; we should endeavor as far as possible to bring about a regular action of the bowels without having recourse to drugs, but unfortunately this is not always an easy matter.

Eggs, meat, fish, and milk products are what these patients usually digest the best, and they often of their own motion exclude vegetables from their diet. When they are simply advised to take vegetables, without any additional recommendation, they do not get along very well;

the sensations of weight and of gaseous distention of which they complain are increased. Some even suffer from veritable gastric crises when taking vegetables and green fruits. The results of such a diet are even worse when there is a tendency to stasis or when the atony of the stomach is temporarily increased. If then it is thought best to advise the taking of vegetables, and this counsel is good in certain cases, they should be told to eat them in the form of purées, and all fruit should be cooked. It is curious to note that almost all writers, whatever their theories of the condition may be, generally give the same advice. The vegetarian régime, as formulated by Dujardin-Beaumetz, is especially indicated here; given for a certain period, it is of extreme utility, having all the value of a "cure."

In cases in which constipation is very marked the patients may be advantageously counselled to take a grape cure or whey cure. It is difficult to estimate how much of this advantage is to be attributed to the external adjuncts of the cure, such as a sojourn in a picturesque country, promenades in the open air, and tranquillity of mind.

Drinks.—The question of drinks is one of great importance in the therapeutical management of this form of dyspepsia. As a general rule red wine should be forbidden, as that seems to be particularly irritating to the gastric mucous membrane and to favor organic fermentation. We have seen the gastric acidity increase almost immediately in dyspeptics who had taken wine after having been for some time deprived of it. White wine diluted with water is frequently prescribed, and it is not a bad drink in light cases of dyspepsia. The same is true of a light beer or of beer sufficiently diluted with water. But none of these is as good as pure water or faintly alkaline natural mineral waters not too heavily charged with carbonic acid gas; a too large proportion of carbonic acid would be a disadvantage. In general the so-called table waters are very suitable for these cases, and their number is sufficient to permit of a choice. Certain waters poor in alkaline

constituents have the advantage of being very pure and agreeable to the taste.

Milk as a beverage is not suited to more than half the patients of this class; it has the disadvantage of leaving a taste in the mouth and of diminishing the appetite. We shall speak later of kephir, which Hayem recommends highly in cases evidently belonging to this category.

Very often, especially in cases in which flatulence and a feeling of weight on the stomach are prominent symptoms, hot drinks taken with the meals are the best; they alone in a good number of cases suffice to bring about a cure. The patients may take weak tea or a weak grog made of raw or burnt brandy or rum; some prefer chamomile tea or a decoction of orange-flowers, but it makes no difference what the decoction is, the object is simply to induce them to take hot water and the flavoring may be left to the individual taste. Writers are not agreed as to the quantity of fluid which is permissible, some advising a dry diet, others allowing full liberty as to the amount of drink. We usually allow patients taking only hot beverages to drink at discretion, for they then have no desire to drink an excessive amount; indeed, making a person take only hot beverages is generally equivalent to making him drink less. There are some people who really do drink too much, two or three pints with each meal, for example, and these must be put upon absolute rations; instead of taking two or three pints at each meal they must content themselves with that amount in the twenty-four hours.

The use of ice must be prohibited, and no very cold beverages should be permitted. It may be true that cold water will produce contractions of the smooth muscular fibres just as hot water does, but this contraction quickly yields to a very pronounced relaxation, and, as we have seen, one of the principal indications in the treatment of nervo-motor dyspepsia is to combat the tendency to relaxation of the smooth muscular fibres of the gastro-intestinal tunics.

Bread.—Only a relatively small amount of bread is al-

lowable. It is a matter of common observation that the ingestion of a large quantity of this article of food frequently causes a sensation of weight in the stomach and of general malaise. As a general rule not more than 100 grammes (about three ounces) should be taken at each meal. The bread must be well cooked, preferably stale, and it must be chewed slowly, so as to become thoroughly mixed with the saliva.

We must insist even more firmly upon a strict observance of our recommendations when there is a tendency to stasis, to hyperacidity, or especially to gastric intolerance. Stasis and hyperacidity are often shown subjectively by a sensation of burning or even of pain at the pit of the stomach. There are acid eructations and sometimes regurgitations of the contents of the stomach, causing an acid and bitter taste in the mouth. This bitterness seems to be due, not to the bile, as was formerly supposed, but to peptone. Sometimes, but more rarely, there are eructations of a fetid character, having the odor of spoiled meat or rotten eggs. This may happen even when there is no permanent dilatation of the stomach, and when the organ does empty itself, tardily perhaps but still completely, of its contents.

Vomiting may take place at longer or shorter intervals. It is seldom that this happens after each meal, though it may come on at this time and be preceded by severe pain, such as is felt in hyperchlorhydria, in simple ulcer, or in acute or subacute gastritis. Some people, indeed, have an exaggerated excitability of the mucous membrane of the stomach, and in them an amount of organic acid which would not affect others provokes pain and, by reflex action, vomiting. As we have said before, it matters little in these cases whether there is or is not present a certain degree of gastritis. These more serious cases are just on the edge of permanent dilatation, but they often recede under the influence of a suitable diet and medicinal treatment.

The régime must be more severe in these cases than in those which we have hitherto considered. Wine must be

absolutely withdrawn at once in all these cases. It will be well also to wash out the stomach occasionally. Those patients who are willing to submit to this form of treatment will derive much benefit from the administration of meat powder through the stomach tube and from a milk diet. Milk alone, if it is well borne, may be useful; we might institute a sort of milk cure at the beginning. After that it would be well to give freshly prepared meat powder in bouillon, milk soups, rice powder gruel, purées made of dry vegetables, eggs, meat finely minced, and finally cold roast meat well cut up. We shall find in Leube's table gradations which it might be well to follow in bringing the patient gradually back to a normal diet. We might also try kephir, as Hayem recommends.

(*b*) *Climatotherapy.*—The resources of climatotherapy are by no means to be despised in these cases, for it is a good deal to take patients from their habitual surroundings and place them in new ones where they will live a less artificial life and be less overworked mentally. Climatotherapy is directed more particularly against the nervous element in the disease; it includes travelling and a sojourn, for a longer or shorter period, in a new place. Travelling may be recommended to patients who do not suffer too much from hotel life and who can stand table d'hôte accommodations. The benefit afforded by a life in the open air and by a change of scene constitutes very largely the advantage of a course at any of the popular spas. Physicians practising at these resorts ought to make the most of every advantage which the place offers. They should not be afraid to lay down minute directions concerning exercise, promenades, massage, hydrotherapy, etc. These nervo-motor dyspeptics, so often neuropathic, are the patients who must be disciplined and the physician should never hesitate to act with authority.

(*c*) *Special Manœuvres of a Physical Nature.—Gymnastics.*—Exercise of this nature is especially useful from the point of view of general health. It increases the rate of metabolism and improves the appetite. It is more par-

ticularly valuable in the case of dyspeptics who lead a sedentary life and do not take sufficient exercise to work off by physical labor the excess of nutritive material taken into the system. Some of these exercises have, as their special object, to overcome the tendency to constipation; they are executed as follows: the patient lying on a sofa raises himself to a sitting posture without the aid of his hands; then, standing with the back against a wall, he bends forward and again straightens up, touching the wall with the hands alternately above and below. This is what is called Dally's wall exercise.

Hydrotherapy.—This is a favorite method of treatment of dyspepsia among certain physicians. It acts more especially in an indirect way, by improving the general health and reducing the neuropathic tendency. The principal methods of applying this treatment are cold sponging, the cold pack followed by rubbing, the cold douche in the form of shower or continuous jet, the alternating cold and hot jet, the Scotch douche, and the hot douche. Cold sponging or the cold pack followed by friction may be used in the case of neurasthenics and of the anæmic or chlorotic who are afraid of the cold douche and who may be gradually accustomed to it in this way. The cold douche, especially in the form of a continuous jet, is indicated when it is desired to tone up weak and debilitated subjects. The hot douche is better adapted to those of an excitable disposition with a tendency to insomnia. According to our experience, neurasthenics are more often benefited by the hot jet douche than by the cold.

Massage.—We must distinguish here between general massage and local massage made with a special object. General massage may be useful under certain conditions in the same way as hydrotherapy, climatotherapy, or gymnastic exercises. The special object of local massage is to combat the atony of the stomach or intestine and to cure constipation.[1]

[1] Dujardin-Beaumetz: "L'Hygiène Thérapeutique," 2d edition, 1890.

Electrization.—All forms of electricity have been employed, static, faradic, and galvanic. Of course static electricity is employed only externally. The patient, seated on a chair with glass legs, so as to be completely isolated from the floor, is connected with the accumulator of a static machine; then, by means of rods or balls of metal connected with the ground by a chain, electric sparks are drawn from the epigastric region. The stimulation seems to be sufficient to provoke contractions of the stomach; and this supposition is rendered all the more probable by the fact that the same stimulus applied along the course of the large intestine is followed in a short time by a movement of the bowels.

Galvanization and faradization may be applied externally or internally. When applied externally one of the poles is placed in communication with the skin of the lumbar region by means of an electrode made of a large piece of tin covered with chamois and wet with a saline solution; a similar electrode of smaller size, connected with the opposite pole, is placed over the epigastric region. By using rather large electrodes we avoid an electrolytic action when employing direct currents.

For internal electrization various sounds have been constructed, all of which are made upon the same principle. The conductor, either a wire or a very flexible metallic rod, is inclosed in a stomach tube, and terminates in a ball or metallic button within the tube, a short distance from its opening extremity. In this way the end of the rheophore cannot come in contact with the mucous membrane, and the electric current can reach it only through the liquid contained in the stomach; we thus avoid all danger of ulceration by electrolytic action. The other pole is brought into contact with the skin by means of a large flat electrode. We may, by employing this apparatus, apply either galvanic or faradic currents. Einhorn has modified this apparatus in quite an elegant way. The intragastric electrode consists of a metallic ball enclosed in a hard rubber capsule having many openings; this capsule serves to prevent di-

rect contact of the metal with the stomach-wall. The ball is connected with the battery by a very fine soft wire enclosed in a flexible rubber tube of small calibre, and it is introduced into the stomach by the act of swallowing, the passage of an œsophageal tube being thus avoided. This is called by Einhorn the "deglutable stomach electrode."[1]

The intensity of the continued current may vary between 10 and 30 milliampères, but it should always be reduced to the lower figure when opening or closing the circuit.

Electrization of the stomach causes contraction of its walls, and is an active means of combating atony and dilatation. Ravé's[2] researches show that electrization excites the secretion of the gastric juice, whence the conclusion follows that, if this measure be useful in nervo-motor dyspeptics in whom secretory atony often accompanies motor atony, it is contra-indicated in patients with hyperchlorhydria in whom the secretion should not be increased but rather lessened. Electricity, either galvanic or faradic, when externally applied seems actually to reach the stomach provided we employ electrodes of sufficient size and sufficiently moistened; it is certainly easy of application and unobjectionable.

Support to the Abdomen.—The phenomena of nervo-motor dyspepsia have been attributed by Glénard[3] to enteroptosis, that is, to a falling down of the mass of intestines insufficiently supported by the abdominal walls. This would result in a very marked drawing upon certain parts of the mesentery and of the nervous plexuses. There is no question but that this prolapse of the intestines as a whole does occur in certain cases, as, for example, in women who have had many successive pregnancies and in individuals who have become emaciated after having previously been very corpulent. There is, in such cases, often a tendency to veritable pantoptosis, to a sinking down of

[1] The New York Medical Record, May 9th, 1891.

[2] Ravé, "Traitement des Dyspepsies par l'Électricité." Thèse de Paris, 1892.

[3] See the chapter on Enteroptosis.

all the organs suspended in the abdominal cavity. When this occurs the application of a well-fitting abdominal bandage is productive of great relief. We are in the habit of recommending a belt made of three folds of tricot, forming one plait behind and simply overlapping in front, so as to make a broad band, and fastened by safety-pins. The advantage of this simple belt is that it may be applied very exactly, the three bands being independent of each other. The lower band, which has a tendency to slip up, may be kept in place by straps passing between the thighs or by elastics attached to the stockings.

Excito-Motor Medication.—Are there any drugs which have the special property of stimulating the gastric muscles to contraction? But few investigations have been made as yet in this direction and the experimental methods upon which they have been based are not all of an equal value. Klemperer has made some experiments by means of the oil test, which consists in giving 150 grammes of oil before a test meal; the food is then ingested together with the substances whose action is to be determined, and the stomach is emptied at the end of a given time. The amount of oil present in the liquid removed is determined by dissolving it out with ether. The less oil there is remaining in the stomach, the more active are supposed to have been the gastric movements. The method is certainly not without its disadvantages, for it is not a very simple matter to make the patient ingest 150 grammes of pure oil; and furthermore the presence of the oil may, in itself, influence the functional activity of the stomach, so that we are not working under normal conditions. But however this may be, Klemperer holds that alcohol, the bitters, and strychnine are stimulants of the gastric movements. The excito-motor action of alcohol has been disputed by many writers.

Ewald, basing his conclusions upon the results of the salol method of experimentation, has also come to the conclusion that strychnine is an excitant of the gastric movements. This method is based upon the fact that salol is

not attacked in the stomach but that, when once it has reached the intestine, it is split up by the action of the pancreatic juice into salicylic acid and phenol. The subject is made to take a dose of 15 to 30 grains of salol, and then the urine is examined every fifteen minutes by the chloride of iron test, for traces of salicylic acid. This substance, when it exists, forms a very marked deep blue color with perchloride of iron. The more active the movements of the stomach are, the sooner will this reaction appear in the urine, but in cases of atony and stasis it will be more or less delayed. These conclusions of Ewald have been disputed, and it has been held that the significant fact is rather the length of time during which the presence of salicylic acid may be determined in the urine; the more inefficient were the movements of the stomach, the more slowly would this acid be eliminated, and consequently the longer would its reaction be obtained in the urine. It has even been asserted recently that the phenol resulting from the decomposition of salol may be found in the gastric juice, and this fact, if true, would render the method valueless (Berlin Medical Society, October 29th, 1888).

Klemperer says that an increase in the acidity of the gastric juice does not accelerate the movements of the stomach, but that, on the contrary, an excess of hydrochloric acid retards the expulsion of the gastric contents. This statement tallies with what we know of hyperchlorhydria with hypersecretion, which is so often accompanied by dilatation and stasis.

Marcone[1] says that bitters taken with the food increase the quantity of gastric juice and also stimulate the muscular walls of the stomach to greater activity.

From our own observation of the results obtained in the treatment of flatulent dyspepsia, we have come to regard ipecac in small dose as one of the best stimulants of the muscular coat of the stomach. We may give the remedy in powder, in doses of from $\frac{1}{3}$ to $1\frac{1}{2}$ grain after each meal. This amount should be given in broken doses

[1] La Riforma Medica, June, 1891.

at intervals of a half-hour or an hour, in wafers, with or without other powders, such as bicarbonate of soda, cinchona, calumba, etc. The drug may also be given in the form of the ipecac lozenges of the shops, from two to five of which may be taken at intervals after each meal. We prefer, however, a mixture of equal parts of the tinctures of ipecac, calumba, and gentian, the dose being so proportioned that the patient receives an amount of the tincture equivalent to the above-mentioned quantity of ipecac in powder.

Administered in these doses ipecac ought not to provoke nausea, but as individuals vary greatly in their susceptibility to this action of the drug, it should be given tentatively at first. It is well to assure the patients that, although they are taking ipecac, there is no occasion for them to suffer from either nausea or vomiting, otherwise the simple name may suffice to excite these symptoms in them by suggestion.

In certain cases of neurasthenic dyspepsia in which there was a tendency to stasis, I have sometimes administered ipecac in another way. I gave it once every three days in dose sufficient to produce a slight degree of nausea and moderate salivation. The following day a douche bath was administered, and the day after that nothing except the ordinary alimentary régime; and so on in series of three days each. I obtained very good results from this practice.

Ipecac does not act upon the stomach alone, but also upon the bowels in such a way as to increase their action, this being an additional advantage when constipation exists, as it nearly always does in the cases under discussion. In order to increase this action still more, tincture of rhubarb may be given at the same time with the tincture of ipecac.

The bitters given in the form of tinctures after meals, while digestion is going on, seem often to have an excellent effect upon the appetite. It would appear also that their aperitive action is greater when they are given in

this way than when they are taken on an empty stomach or immediately after meals.

Excito-Secretory Medication.—With rare exceptions, and those among recent writers, the aim of physicians in the treatment of dyspepsia has always been to excite the secretion of the gastric juice. Leven, however, opposes this view, believing that the trouble lies in the presence of an undue amount of fluid in the stomach, in gastrorrhœa, which he attributes to inflammatory congestion of the gastric mucous membrane. Hayem, who takes an almost exclusively chemical view of dyspepsia, lays great stress upon hypopepsia, which he finds of frequent occurrence, and is thereby led to attach great importance to whatever will excite the secretion of the gastric juice and increase its chemical action. We do not attach so much importance to a simple diminution of the chemical processes taking place in the stomach, but place great dependence upon the intestine for supplementing the action of the stomach, and we therefore think that the great enemy to be combated is the motor insufficiency of this organ, whether any lesion be present or not. Our aim is, therefore, to tone up the general system and to increase the gastric movements. Nevertheless, when there is a diminution in the quantity of hydrochloric acid secreted by the mucous membrane, we think it well to increase the chemical function of the stomach, provided we can do so without prejudice to its motility. It is not easy, however, to act thus upon one independently of the other, and certain motor stimulants are at the same time excitants of secretion; these are, without doubt, the best agents to employ in the treatment of nervo-motor dyspepsia associated with diminished secretion of hydrochloric acid.

There are very many substances capable of stimulating the flow of gastric juice. Unfortunately many of them are dangerous, and many of them are liable to cause gastritis when too long continued, for the same reason that they increase the secretion. Hayem has shown by a number of interesting experiments that the primary stimula-

tion shown in the increased secretion of hydrochloric acid is often followed by a secondary period during which a diminution or even an actual suppression of this secretion takes place. It has not been proven that gastritis is responsible for this secondary weakening of the chloro-peptic functions of the stomach, yet we cannot be too cautious while giving these remedies. We must not push the stimulation of the mucous membrane of the stomach too far nor follow it up too long. We are prepared, indeed, by what we have learned of nervo-motor dyspepsia not to carry the use of excito-secretory medication to too great lengths.

Alkalies as Excitants of Gastric Secretion.—The least dangerous of these is bicarbonate of soda. It has been shown by numerous authors that bicarbonate of soda in small dose may increase the acid secretion of the stomach. The theory of this is that the bicarbonate of soda in combination with hydrochloric acid is split up into chloride of sodium and carbonic acid, both of which substances stimulate the mucous membrane and increase its secretion. This theory remains to be confirmed by more careful analysis.

Gilbert has begun a series of experiments in this direction, but has not yet completed them. He conducted them on a dog having a gastric fistula, the chemical functions of whose stomach he had previously determined by Winter's method. He gave to this dog a one-half per cent solution of bicarbonate of soda, which is about the proportion of this salt contained in Vichy water, sometimes with the meat, sometimes before and sometimes after it. When the alkaline water was administered at the same time with the meat the gastric secretion was not modified, nor was it when the water was given a quarter or a half-hour before eating. But when it was given an hour before it increased the secretion of the gastric juice and the production of hydrochloric acid. When the alkaline water was given to the dog after his meal, digestion was retarded.

The results of these experiments are not entirely satis-

factory, and it would be very desirable to ascertain what takes place in the human subject under analogous conditions, and not only in healthy individuals, but also in those suffering from the different varieties of dyspepsia. It would be well also to ascertain, not only the proportional amount of hydrochloric acid, the percentage, but also the absolute amount contained in the total quantity of the gastric juice, a procedure which can be carried out in a certain number of patients by employing the method described by Rémond and myself.

But since it has been shown that, whatever way it acts, bicarbonate of soda, given in small doses on an empty stomach, does increase the secretion of hydrochloric acid, it would be proper to advise patients suffering from a lack of this secretion to take an alkaline water some time before meals. We have shown that hot drinks are useful in overcoming muscular atony of the stomach, and we may fulfil a double indication by giving the alkaline water as hot as possible an hour before eating.

Recently Lemoine and Linossier, as a result of their observations on a case of merycism, have asserted that bicarbonate of soda was always, even in large dose, an excitant of the secretion of hydrochloric acid. This view of the action of bicarbonate of soda has never been held by any except the authors above mentioned, and it does not at all coincide with what we ourselves have seen in cases of hyperchlorhydria. Nevertheless, we are willing to admit that even in these cases we must not abuse the administration of bicarbonate of soda.

There are many other excitants of the gastric secretion, such as alcohol, many alcoholic tinctures, iodides and bromides of potassium and of sodium, probably tincture of iodine, the chloride and the sulphate of sodium in small doses, kephir, the bitters, possibly creosote, which has been recommended as a stomachic by Klemperer, spices, and the astringent tonics, among which we naturally place condurango. This list might easily be increased by the addition of other drugs and of compounded beverages the

abuse of which may excite gastritis. The stimulating action of drinks of this kind is the more marked since they are ordinarily taken before meals, but if taken with food their action is much less evident. It is for this reason that the so-called appetizers (vermouth, absinthe, etc.) are more apt to cause dyspepsia than cognac, which is not ordinarily taken fasting. Certain medicated wines, rich in alcohol and in tannin, like wine of cinchona, are very irritating to the stomach. The same is true of iron, naphthol, and many other substances.

The prolonged use of these remedies usually brings about more or less marked exhaustion of secretion and may even lead to complete suppression. Certain agents, such as the chloride or the sulphate of sodium, seem to stimulate the mucous membrane in small doses of 15 to 45 grains and to depress the secretion when given in larger doses of 60 to 90 grains. These are facts which we ought not to lose sight of, and Hayem, who insists upon this particular point, maintains that apepsia is frequent in patients who have taken one or more courses of the waters at Carlsbad. The Carlsbad treatment is not suited to cases of atony with diminished secretion of hydrochloric acid, unless it can be proven by clinical observation that the improvement of the digestion as a whole is so great as to compensate for the diminished chemical functions of the stomach.

Leven gives moderate doses of certain salts immediately before meals; these are chloride of sodium, sulphate of sodium, iodide of potassium, phosphate of calcium, or phosphate of sodium, in doses of 3 to 5 grains. With the exception of the phosphate of calcium, which is a weak alkali resembling the carbonate of the same base, these salts are undoubtedly excitants of the gastric secretion. "If we exceed this dose, giving 15 to 30 grains of any of these drugs, we run great risk of producing cramps in the stomach and of deranging its functions." [1]

We have already spoken of alcohol and have said that, from the results of numerous experiments, we may con-

[1] Leven: "Traité des Maladies de l'Estomac," page 424.

clude with Boas that this substance in small dose has no injurious effect upon digestion. Given before eating it stimulates digestion, but we must be very cautious in recommending the use of gastric stimulants when the patient is fasting. The same caution is necessary in the case of the astringent tonics, such as cinchona, tannin, and condurango, especially when they are given in the form of tinctures. If the use of these agents is thought advisable it is much safer to give them after meals when they will be diluted by the contents of the stomach. When so given their effect upon the appetite is in no way diminished, and may even be increased.

Hayem speaks in the highest terms of kephir, which he regards as the best remedy in cases of diminished or absent gastric secretion. We have already referred to its composition and mode of administration.

The number of substances capable of exciting the gastric secretion is not small, but on the contrary very large. The difficulty is not in stimulating the secretion, but rather in keeping it within bounds, so that we need have no fear of causing gastritis or of exhausting the secretory, functions of the stomach. We must also avoid exciting the stomach to increased action by remedies given with an aim other than the treatment of dyspepsia, as, for example, by iron in anæmia, by the iodide or the bromide of potassium, etc. Naphthol especially is a very dangerous drug in this sense.

In the case of nervo-motor dyspeptics in whom gastro-intestinal flatulence was a prominent symptom, we have often given with good results a powder composed of 15 grains of sulphate of sodium and 30 grains each of chloride and of bicarbonate of sodium. This is to be taken in a glass of water in the morning fasting, or at least a certain time, say half an hour, before a meal. The powder may also be given during meals dissolved in the table water, which should preferably be slightly carbonated. The results of the remedy given in this way have often been satisfactory. But there were several elements which might

have contributed more or less to this success. In the first place the carbonic acid in the table water would excite the secretion of hydrochloric acid;[1] and then the patients were subjected to the observance of a special régime, a point upon the importance of which we cannot insist too strongly. We may obtain a successful result with the employment of very different methods, provided only that there is some rule, some discipline, to which these nervo-motor dyspeptics, who are often at the same time neurasthenic, are forced to submit. Both patients and physician should be penetrated with this truth. If the discipline of diet were better understood and more rigidly practised at health resorts, even at those where the waters are chemically indifferent, these places would become sanatoria of the greatest value for many dyspeptics; and the results of treatment at springs the waters of which are really active therapeutically would be vastly better than they are now under the existing conditions.

Acid Medication.—The idea of treating certain forms of dyspepsia by strong acids, especially by hydrochloric acid, is by no means new. Their employment is in some sort traditional in England; and it is from the practice of English physicians that Trousseau borrowed the idea. He relates in his treatise on Clinical Medicine that he was struck on seeing one evening at dinner a neighbor, who had travelled in countries where English medicine was practised, take from his pocket a little vial containing hydrochloric acid and pour out five or six drops. From his conversation with this man he became convinced that this practice was of real value in certain cases, and he hastened to adopt it, though rather timidly as he gave it in doses of only one or two drops after meals. After the movement in the direction of a chemical examination began in France, which has in large measure revolutionized the treatment of gastric dyspepsia, hydrochloric acid was given to all and indiscriminately.

[1] Jaworski: Deutsche medicinische Wochenschrift, Nos. 36–38, 1887.

The examination of the contents of the stomach showed that there might be a diminution or even a complete suppression of the secretion of hydrochloric acid in certain varieties of dyspepsia, and nothing seemed more natural then than to replace the missing acid by way of the mouth. Furthermore it was demonstrated that hydrochloric acid plays the rôle of an antiseptic in the gastric juice, and this was another reason for giving it in relatively large quantities. It was known, before these researches were made, that the employment of hydrochloric acid in large doses was often productive of good in the forms of dyspepsia qualified as acid by reason of the acid eructations which were present.

At a later period Talma gave this acid even in cases of round ulcer; he administered it also in almost all cases of dyspepsia, feeling his way, as it were, in order to learn how it was tolerated. In this way he came to the knowledge that certain dyspeptics, especially, he thought, nervous dyspeptics, have a veritable hyperæsthesia as regards acids. The fact is true, as other authors have borne witness. We have noted on several occasions that some patients have an exaggerated sensibility to the action of hydrochloric acid, but this special hyperæsthesia in no way characterizes nervous dyspepsia.

In many dyspeptics from one-half to one part per thousand of hydrochloric acid would be needed to bring the proportion up to the normal figures. If now we remember, as was shown when speaking of saturation by alkalies, that more than 5 litres of liquid, counting food and secretions, pass through the stomach, we see that from 2 to 6 grammes of hydrochloric acid would be necessary to re-establish the equilibrium. But this is the pure acid, and as the officinal acid contains only about one-third of its weight of hydrochloric acid, it would be necessary to give from 6 to 18 grammes of the officinal acid a day. These high figures have never, as far as we know, been reached; but it is now well understood that large doses of hydrochloric acid or of other strong acids are much

better tolerated than one would have supposed a few years ago.

Ewald[1] gives from 90 to 100 drops of hydrochloric acid in three or four doses at fifteen-minute intervals after meals. Rosenheim[2] advises the administration of 6 to 10 drops of hydrochloric acid in a little water repeated several times at intervals of fifteen to thirty minutes after meals. The German officinal hydrochloric acid is of 25 per cent strength.

Leube is satisfied with much smaller doses. Riegel holds that the dose should vary according to the individual case. Boas is partial to small doses because he believes that the large doses recommended by Ewald are insufficient to provoke digestion in cases in which hydrochloric acid is wholly absent from the gastric juice. The truth is that this acid combines either with the alkaline salts or with the albuminoid substances. In cases in which there is free hydrochloric acid, but in insufficient amount, he gives once or twice while digestion is going on from 15 to 20 drops of the officinal (25 per cent) acid. When the object is to stimulate digestion he gives the acid from fifteen to thirty minutes after eating, and when he desires simply to prevent the fermentation of food remaining in the stomach the remedy is administered when digestion is not going on.

Bouchard[3] uses a 0.4 per cent solution of strong hydrochloric acid, letting the patient take a few swallows during meals or a wineglassful several times repeated after eating. It is especially toward the end of digestion, he says, when the secretions are becoming exhausted, that we must come to the help of the stomach. As much as a pint and a half of the above solution may be given during the day between meals.

Hayem employs a one-per-cent solution, of which he

[1] Boas: "Allgemeine Diagnostik und Therapie der Magenkrankheiten," p. 248.

[2] "Krankheiten der Speiseröhre und des Magens," page 151.

[3] "Auto-intoxication," p. 197.

gives a tablespoonful in a quarter of a glass of sweetened water warm or cold, two or three times a day. In this way the patient takes from five to seven minims of strong hydrochloric acid in the twenty-four hours.

Hydrochloric acid is without doubt the most commonly employed of all mineral acids at the present day in the treatment of dyspepsia, yet the English use a number of other strong acids, among which, according to Coutaret,[1] are the following: Nitric acid (17.44 per cent), sulphuric (12.5 per cent), phosphoric (13.8 per cent), nitro-hydrochloric (28 per cent). These acids are taken in doses of from 10 to 30 drops after meals in a little water, wine, or beer. Of all those mentioned the preference is usually given to nitro-hydrochloric acid.

Basing his ideas upon this practice and also upon certain theoretical notions of his own, Coutaret employs what he calls "Rabelized sulpho-nitric acid" (*acide sulfonitrique rabelisé*). The following are its formula and dose:

℞ Chemically pure sulphuric acid,	28 parts.
Nitric acid,	8 "
Alcohol (60 per cent),	180 "

The acids are added to the alcohol very slowly in a vessel surrounded by ice, and the mixture is left in an unstoppered flask for fifteen days; then the flask is closed and the preparation is allowed to ripen for ten months before being used. It contains sulphonitric acid and a small quantity of nitric ether. The author makes a solution for use containing four parts of the acid to fifty parts of distilled water and gives of this a tablespoonful in a little water after meals; double this quantity may be given if desired. Hayem says that he has used this mixture without any benefit.

The vegetable acids are seldom employed; we shall refer to lactic acid when we come to the treatment of diarrhœa, and have already spoken several times of kephir.

[1] "Comment les Anglais Traitent leur Dyspepsie," Bulletin Général de Thérapeutique, 1892.

And now, after having given a *résumé* of the methods used by various authors, we may be allowed to present our own views. But first, what have chemical researches taught us concerning the effect produced by these acids upon gastric digestion? In what way do the strong acids, and hydrochloric acid in particular, influence the functional action of the stomach as regards its secretion and movements? We must confess that our knowledge concerning these matters is very slight, as what we have learned of the effect of hydrochloric acid has been almost wholly derived from the simple statements of the patients.

Jaworski [1] has concluded from the results of experiments that the prolonged administration of hydrochloric acid might cause the suppression of the secretion of the same acid by the stomach. Reichmann and Mintz [2] gave to five patients 15 drops of dilute hydrochloric acid three times at intervals of fifteen minutes, beginning one hour after each meal. Every ten to sixteen days they gave a test meal and made an analysis of the gastric juice. The results varied in the different cases; in some there was an increase, in others a diminution in the quantity of hydrochloric acid secreted.

In certain individuals the administration of hydrochloric acid increases the movements of the stomach, in others it diminishes their force. In cases of hyperchlorhydria with hypersecretion there is an evident tendency to dilatation of the stomach, but it must be admitted that the conditions here are peculiar. The exaggerated secretion of hydrochloric acid is continuous, and the irritation to which it gives rise may finally lead to exhaustion; and then gastritis always makes its appearance at some period, either immediately or after the disease has existed for a longer or shorter time.

What indications are we to deduce from these unsatisfactory and often contradictory data? Hydrochloric acid is evidently unsuited to cases of hyperchlorhydria, and

[1] Wiener klinische Wochenschrift, No. 25, 1891.

[2] Deutsche medicinische Wochenschrift, Nos. 36, 38, 1887.

should be given only when there is a diminished secretion of this acid, and all patients even of the latter class do not need it. We prescribe it for those who have pronounced anorexia and a marked tendency to stasis and organic fermentations. In the case of the first named, even when given in the moderate amount of 10 to 20 drops in divided doses after meals, it increases the appetite and seems to improve digestion, diminishing the sensations of malaise and of weight. It is for this reason that it is employed with advantage in the early stages of tuberculosis and in the chlorotic. When stasis and fermentation are present it may be given in larger quantity, 20 to 40 drops or more after each meal in divided doses at intervals of twenty to thirty minutes; its administration should be intermitted for a time every eight or ten days.

A small quantity of bitter tincture or of tincture of ipecac may be added to the solution of hydrochloric acid. Some patients complain that this acid acts upon the teeth and it is well therefore to have it taken through a glass tube. There can be no doubt that good effects are obtained from the remedy given in these conditions. Does it act as a mechanical irritant, as an excitant of secretion, or as an anti-fermentative? Or does it act by hastening the transformation of the pepsinogenous substance into pepsin? Possibly there is a little of each of these actions.

In no case, however, does it suffice by itself to re-establish the equilibrium; its employment does not absolve us from the necessity of having recourse to everything in the way of diet and medication which may diminish the possible stasis and excite the weakened motility of the stomach. As we have said before, we attach a much greater importance, in many cases of dyspepsia, to a vice of motility than to one of secretion.

Digestive Ferments.—Elements passing through the digestive tube meet successively: in the saliva, the ptyalin which acts on starchy substances, transforming them into dextrin and glucose; in the gastric juice, the pepsin which, in the presence of hydrochloric acid, peptonizes the

nitrogenous materials, and the rennet, which coagulates casein; in the intestine the pancreatic juice, which is capable of peptonizing albuminoids, of transforming the starches into glucose, and of emulsifying the fats. Perhaps the intestinal juice has a rôle similar to that of the pancreatic juice; this point has neither been absolutely proven nor denied by physiologists.

It was natural to employ these ferments in the treatment of dyspepsia as soon as we had learned to isolate them and to prepare them artificially, or rather to extract them. We therefore have in commerce pepsin, papain, pancreatin, maltin, etc.

Let us first take a glance at the principal types of the preparations which have for their object to produce an artificial peptonization, by means of ferments extracted from plants or animals, of the food subtances in the digestive tube. The animal peptonizing ferments are pepsin and pancreatin.

Pepsin is falling more and more into disuse and justly so, for the objections to it are numerous. Artificially prepared pepsin is certainly much less active than that elaborated by the stomach. Furthermore, the numerous experiments of artificial digestion made by means of human gastric juice have shown that the pepsin is present in the great majority of cases in sufficient quantity; what is wanting is the hydrochloric acid, and all that is necessary to obtain a satisfactory digestion in the test-tube with otherwise inactive gastric juice is the addition of this acid. Another objection to the employment of pepsin is the well-demonstrated fact that gastric digestion may be very weak, incomplete, or even absent, without any special deterioration of the general health or appreciable diminution of metabolism. Soulier[1] supplies us with a final argument against the use of preparations of pepsin when he tells us that these preparations are often of bad quality, rapidly deteriorate, and are incorrectly compounded, con-

[1] H. Soulier: "Traité de Thérapeutique et de Pharmacologie," p. 318.

taining too much alcohol or glycerin, which is injurious to the stomach.

The same objections may be advanced against pancreatin, and we may add that it acts well only in an alkaline medium. It would be necessary, therefore, to give it with a quantity of alkaline salts sufficient to neutralize completely the contents of the stomach. The most logical method of giving it would be to add it to strongly alkalinized meat powder introduced through a stomach tube. The only indication for pancreatin would be furnished in the case of patients who have, in addition to a diminished secretion of hydrochloric acid, a marked reduction in the amount of urea excreted through the urine, or of those in whom, the quantity of urea being normal or even increased, there is a marked tendency to emaciation.

Reichmann[1] speaks highly of the good effects of pancreatin in atrophic catarrh of the stomach. He prepares it in the following way: he takes a fresh beef pancreas, minces it fine, and puts it in a pint of 15 to 20 per cent alcohol; this is kept in a cool place for a day or two and then filtered. A small wineglassful of this alcoholic extract of pancreatin is taken immediately after eating.

A peptic ferment has been extracted from certain insectivorous plants, especially from the Carica papaya (papaw). This papain has a very active digestive power in the test-tube, but it possesses the same disadvantage as pancreatin in that it is more active in an alkaline than in an acid medium.

The attempt has been made to do for the starches what pepsin ought to do for the albuminoids, namely, to introduce into the digestive tube ferments capable of increasing the action of ptyalin and of pancreatin. When starchy grains begin to germinate there is developed within them a ferment capable of bringing about the transformation of starch into sugar. If such grains are dried and ground, we get a farina containing the diastase necessary for its digestion. Thus from barley we obtain maltine and mal-

[1] Deutsche medicinische Wochenschrift, No. 7, 1889.

tose. The employment of these preparations is very logical in certain cases in which starchy foods are not well borne.

Pepsinogenous Substances.—The researches of Corvisart and of Schiff, confirmed by Leven, have shown that certain substances have a property of supplying to the gastric glands the peptogenous principles which form pepsin in the presence of hydrochloric acid. The pepsinogenous power of the gastric mucous membrane is exhausted during digestion, and normally a long period of repose is necessary to restore this function. But if bouillon or dextrin be given to an animal under experiment, pepsin is found to reappear very rapidly. These substances have, therefore, a real peptogenic action. Some authors treat gastric dyspepsia by means of these peptogenous substances. Herzen[1] advises the taking of a cup of bouillon half an hour before meals, and he says that dextrin may be given even by enema. Dujardin-Beaumetz gives the following formula for an elixir:

℞ Dextrin,	10	grammes.
Rum,	20	"
Simple syrup,	70	"
Water,	160	"

This pepsinogenous medication may be thought of occasionally in the course of the tentative treatment to which we are often reduced in the atonic forms of dyspepsia.

The possibility of fabricating peptones by artificial digestion has given rise to the idea that already digested nitrogenous substances, requiring only absorption and assimilation, might be used in cases of necessity, but unfortunately the results have not justified the expectations of those making the experiment. It has been found that peptones are not well borne and readily excite diarrhœa. Meat powder, either pure or mixed with diastase, is far preferable to peptone. It is uncertain whether the latter is useful even in the form of enema. Articifical digestion in a test-tube is far from being the same as natural digestion

[1] Revue Médicale de la Suisse Romande, February, 1884.

in the alimentary canal. It has furthermore been shown that peptone is a toxalbumin, and it has been claimed that certain accidents, tetany, for example, have been caused by the production of a peptone of poor quality in the stomach of patients with hyperchlorhydria (Bouveret and Devic). If that is so we can hardly put much trust in the peptones of commerce.

Conclusions.—We have been led into a rather long digression *à propos* of antidyspeptic remedies, a consideration of which would naturally come in this chapter, and we think it advisable therefore to review rapidly the general principles of the treatment of the mild and medium forms of dyspepsia in which the nervo-motor element predominates.

These patients are often neuropathic, and hygienic and tonic treatment is frequently of as much importance as that directed against the dyspepsia itself. The observance of mental repose, moderate and progressive physical exercise, climatotherapy, static electricity, massage, and hydrotherapy are the measures to be employed to this special end. We must adapt each of these agents to the indications in the individual case, and should not prescribe excitants, cold douches, for example, for very susceptible persons who would do much better with warm douches.

The diet must be regulated in a general way according to the rules laid down in a special section; it is of very great importance and will of itself suffice, in a number of cases, to bring about a cure. We cannot too strongly insist that patients of this class, who are very numerous, must before all be subjected to a rigid discipline. They must not be allowed to indulge in overeating or in the abuse of stimulants, alcoholic beverages, spices, or food of too rich a character. The table d'hôte, such as it exists in mineral spring resorts in France, is deplorable in this respect. We have repeated this often enough. A word to the wise is sufficient.

Whether there is or is not in these cases of dyspepsia a diminished secretion of hydrochloric acid is of minor im-

portance, provided only the intestinal digestion is active enough to make up for the deficiency of the gastric, so that the general condition remains good and the losses of the organism do not exceed the receipts. The main point is to re-establish the normal gastric movements. For this we may have recourse to hot drinks, to ipecac, or to nux vomica given after meals. Constipation should be treated when present, and we must see that the stomach is not overloaded or taxed by the accumulation of indigestible matters. The external tonics (hydrotherapy, electricity, etc.) also act in a way to overcome the gastro-intestinal atony.

The observance of a strict diet would be the best means of preventing gastritis, or of arresting its progress if already present. In cases in which there is a diminished secretion of hydrochloric acid we may give small doses of alkalies an hour before meals, and also pepsinogenous substances.

In the case of those who have a tendency to stasis and to excessive fermentation we may give hydrochloric acid and may also occasionally wash out the stomach. Hydrochloric acid, with or without the bitters, may also be employed in cases of marked and obstinate anorexia.

By means of the measures above indicated we shall be able to prevent these patients becoming the subjects of permanent gastric dilatation.

Severe Forms of Nervo-Motor Dyspepsia.—Bouveret[1] has noted the occurrence of severe forms of dyspepsia among neurasthenics, and we also have seen a few cases of this nature;[2] yet there may be neither permanent dilatation of the stomach nor atrophic gastritis in even very severe cases of neurasthenia.

The local symptoms are hardly more accentuated than those which we have noted in the common form. They consist in a feeling of weight at the epigastrium, flatu-

[1] "La Neurasthénie," 2d edition, 1891.

[2] A. Mathieu, "Neurasthénie," Bibliothèque Charcot-Debove, 1892.

lence, belchings, heartburn, constipation, with or without muco-membranous colitis, a more or less marked burning pain in the stomach, coming on some time after eating, and in rare cases vomiting. Nevertheless, the general condition is poor, there is emaciation, and the skin is yellow, earthy, and flabby. These patients are insufficiently nourished, some by reason of the more or less severe pain which follows the ingestion of food, others through want of appetite, discouragement, or indifference. They sometimes arrive at such a state that they can no longer go out and have no inclination to leave the bed or the lounge. The question may even present itself whether there is not latent cancer of the stomach or total atrophy of the glandular system of the gastric mucous membrane such as is observed in progressive pernicious anæmia.

The Weir-Mitchell treatment renders special service in this class of cases. The patient, more frequently a woman, is isolated from her family and entrusted to the care of an experienced nurse, who should be gentle without being weak and whose aim should be to restore gradually the patient's confidence in herself. At first the confinement to bed is absolute, the loss of exercise being made up by massage, which increases metabolism and stimulates the vitality of the muscular system. At the beginning of the treatment the patient is kept upon an exclusive milk diet, but gradually other forms of food are added until an excessive amount of food is taken. Finally the patient is permitted to leave the bed, then to go out, the massage being continued, and thus gradually to resume her ordinary mode of life. As a rule excellent results are obtained from this method of treatment directed against both the mental state and the inanition.

In certain cases of this grave form of dyspepsia we have succeeded admirably with gavage, using meat powder, milk, and eggs. The forced feeding is accomplished by means of the stomach tube.

By this treatment we break the vicious circle in which the patients are moving; they eat little and lose strength

because they are neuropathic, and their nervous condition grows worse as a result of their physical deterioration. But as their strength improves in consequence of more perfect alimentation they regain courage and take up again their normal life. The presence of an actual lesion of the stomach, such as more or less generalized destructive gastritis, is no contra-indication to this method of treatment—it only renders its success more doubtful.

Enteroptosis.—It is proper to speak here of enteroptosis and to see how far the theory so admirably stated by F. Glénard, of Lyons, is tenable. Let us recall briefly what are the main points in this theory.[1] The intestine is folded upon itself a great number of times so as to be contained in the limited space afforded by the abdominal cavity, and it is held in place by the mesentery and omentum, in the thickness of which true ligaments may be distinguished, and also by the muscular bands which form the abdominal walls. Now the gut may be increased in density, as happens when its gas has been expelled and its walls have contracted upon themselves; or the abdominal support may be relaxed; in either case the intestine, no longer properly supported, drags upon its ligaments. The chief of these ligaments passes from the right bend of the transverse colon to the pylorus and adjacent portion of the greater curvature. The colon then in its descent drags upon the stomach, and the latter in its turn through the lesser omentum pulls upon the liver. The kidney is also displaced. It is not enteroptosis merely, but rather splanchnoptosis. This disturbance of equilibrium of the abdominal viscera gives rise to symptoms, some of which correspond very nearly with those that we have been studying under the name of nervo-motor dyspepsia. The reduced abdominal tension would produce the sensation of general feebleness and of renal and gastric weakness. The dragging of the intestine on its mesenteric ligaments and the lesser omen-

[1] Lyon Médical, 1885. Féréol: Société Médicale des Hôpitaux de Paris, 1887-88. Cuilleret: Gazette des Hôpitaux, September, 1888. Kaplan: Thèse de Paris, 1889. Gourcelot: Thèse de Paris, 1889.

tum would provoke sensations of weight, of emptiness and of false hunger. If to these we add the concomitant symptoms due to gastric atony, that is to say, flatulence, acidity, a burning feeling, vomiting, pressure, and gastric cramps, we shall obtain a general picture of the gastro-intestinal dyspepsia of the neurasthenic.

These patients are relieved at once by an abdominal band which raises and supports the intestinal mass. The use of this abdominal support, laxatives, a meat diet, and alkalies bring about a cure, and that confirms the diagnosis.

There is much truth in this notion of enteroptosis, and it is undoubtedly present in many cases. It is observed especially in women who have gone through many pregnancies, and in individuals who were once obese but who have emaciated rapidly. It is true also that a want of tone and relaxation of the abdominal walls favors the occurrence of constipation and the appearance of the symptoms of atonic gastro-intestinal dyspepsia. These patients find great relief from the application of a snug and well adjusted abdominal girdle which does mechanically what the weakened abdominal walls are no longer able to do.

Movable Kidney.—A falling down of the kidney, nephroptosis, is frequently met with in these conditions. I do not think, however, basing my judgment upon the observation of a rather large number of cases, that the mere discovery of a movable kidney should lead to a diagnosis of enteroptosis. This condition, especially when the right kidney is affected, is not particularly uncommon in women; I have seen it in young women in whom there was no appreciable relaxation of the abdominal walls, and have noted its occurrence in women who have had but one child, and even in those who have never been pregnant. Others have made the same assertion as to the relation of movable kidney and pregnancy.

It would seem as though the displaced kidney, dragging upon the nerve filaments, irritated the nervous system and disturbed more particularly the equilibrium of the abdom-

inal sympathetic system. In consequence of this, in those already predisposed we would see general neurasthenia, and, more frequently and more directly, nervo-motor dyspepsia. It is seldom that neurasthenics with movable kidney do not present marked symptoms of dyspepsia. Their dyspepsia may assume any of the different forms of the disease, nervo-motor dyspepsia, hyperchlorhydria, or permanent dilatation of the stomach. The most common form is nervo-motor dyspepsia, the treatment of which we have just discussed. This view is in accord with the opinions of most writers on the subject[1] (Lindner, Landau, Sulzer, etc.).

Patients with movable kidney frequently suffer from attacks of vomiting or even true gastric crises. We shall speak of the latter in a subsequent chapter, and shall concern ourselves here only with the special therapeutical indications resulting from the presence of a movable kidney in the subjects of dyspepsia.

Dyspeptic attacks in persons having a movable kidney come on usually as the result of one of three different conditions, viz., overwork, mental disturbance, and menstruation. We must, as far as possible, remove the patient from the influence of the first two causes.

Walking or standing often suffices to maintain or to bring back an attack which has been excited by fatigue. The patient should rest as much as possible in bed, and this, joined with a proper diet, often brings about a notable improvement. When they are up and walking about they should wear a belt provided with a cushion or pad of special construction, designed to keep the kidney in place, or at least to support it. When this is insufficient, or when the symptoms are really grave, we must consider the advisability of surgical intervention. Nephrorrhaphy gives good results in about fifty per cent of the cases.

It is not uncommon to find a kidney, the right especially, only very slightly displaced. Its lower extremity may be recognized on palpation, but its range of descent is very

[1] Lindner: "Ueber die Wanderniere der Frauen."

limited. When there is no appreciable relaxation of the abdominal walls, the advantage of wearing a belt in such cases is extremely doubtful. We must then content ourselves, and this recommendation applies to all cases, with reducing, as far as the patient will permit it, the evil results of constriction by the corset.

CHAPTER III.

DILATATION OF THE STOMACH WITH PERMANENT STASIS.

Bouchard says that every stomach which does not retract when it is empty is a dilated stomach, but this definition is incomplete, for a stomach may be distended with gas so as not to contract—that is not a dilated but rather a distended stomach. The most important fact, that from which all the evil consequences of a dilated stomach flow, is that there is a retention of liquids and food particles. Every stomach which does not empty itself is a dilated stomach—that is a correct definition. The characteristic fact about true dilatation, that is to say dilatation with stasis, is that the organ is not completely empty in the morning at the end of the longest interval between two meals. In accepting this as the true definition of the condition which we are discussing, we eliminate from the category of dilatation a large number of cases which belong rather to the class of nervo-motor dyspepsia with atony, and we thus restrict very greatly the number of cases of true dilatation.

After making this elimination we still find ourselves in the presence of various unrelated conditions which might well be surprised to find themselves grouped together in the same morbid series. Dilatation of the stomach, even with the restrictions that we have made, is not a primary disease but rather a secondary morbid condition. It is the expression of a number of anatomical and physiological states which differ greatly one from the other, and which it is important to distinguish. We may recognize the following varieties:

1. Atonic dilatation, either temporary or definitive.

2. Hypersecretion with hyperchlorhydria and permanent stasis.

3. Mechanical dilatation dependent upon some lesion of the walls of the stomach or upon pyloric obstruction.

1. *Atonic Dilatation, Temporary or Permanent.*—Nervo-motor dyspepsia, left untreated or uninfluenced by unfavorable conditions of diet or hygiene, has a tendency to pass into permanent dilatation. The food is not expelled promptly from the stomach and remains there all through the interval between meals, at first between the morning and evening repast and later all night as well. In the early stages there is a curable relaxation of the stomach. Medicinal treatment, a suitable diet, and an occasional washing out of the stomach are often sufficient to effect the disappearance of the stasis and its consequences for a longer or shorter period.

In some cases we find that the liquid contained in the stomach, especially in the morning, is colored by, if not entirely made up of, bile. This reflux has been attributed to a permanent incontinence of the pyloric orifice.

2. *Hypersecretion with Hyperchlorhydria and Permanent Stasis.*—We need not return to this form of dyspepsia, to the consideration of which we have already devoted an entire chapter. We would only remark that it is probable that, in the natural course of the disease itself, the hyperchlorhydria may disappear and leave behind it a permanent dilatation, with or without simple hypersecretion. This would be the consequence of gastritis, whether we regard the latter as primary, in accordance with the German theory of acid catarrh, or secondary and consecutive to hypersecretion and atonic retention of material in the stomach.

3. *Mechanical Dilatation Dependent upon some Lesion of the Walls of the Stomach or upon Pyloric Obstruction.*—When there exists a lesion of the stomach wall, a degeneration or destruction of the muscular tunics by some anatomical process, the organ tends naturally to become converted into an inert sac more and more deprived

of contractility and even of elasticity. This is the outcome of all intense forms of chronic gastritis, especially of those forms which are accompanied by a slight degree of sclerosis. When the last-named process is the predominating lesion the condition is apt to be the reverse of this, the stomach being considerably contracted and markedly diminished in calibre (plastic linitis of Brinton).

Any lesion of the pylorus which narrows its orifice, or any tumor in the vicinity which compresses it, becomes, by a mechanism easily understood, a cause of extreme permanent dilatation. The narrowing and the compression of the pylorus may be brought about by a number of dissimilar causes, the most frequent of which are cancer and ulcer. The mere presence of an ulcer at the pylorus may lead to dilatation of the stomach, or the latter may result from the stricture caused by the cicatrization of the lesion.

These mechanical varieties of dilatation are the ones which usually assume the greatest proportions. Nevertheless we sometimes see stomachs of enormous size, filling up half of the abdominal cavity and extending down even to the pubis, in which examination, by the naked eye at least, shows us no sufficient cause for the ectasia.

Let us now see what are the pathological symptoms and the possible consequences of this advanced degree of gastrectasia. The symptoms are most characteristic in those cases in which there is a narrowing of the pyloric orifice. The patients may have in the region of the stomach a sensation of mere weight, more or less uncomfortable it is true, or of actual pain. The pain is never absent when there is an uncicatrized ulcer, and it is usually but not always present when there is a carcinomatous lesion at or near the pylorus. Quite frequently there are acid eructations and pyrosis, but what is especially characteristic is the vomiting and the way in which it is produced.

This vomiting occurs only at intervals of two or three days and is then very copious. The patients reject whole basinfuls of a liquid frequently containing particles of un-

digested food. In these matters may be seen food which has been taken perhaps several days before, as for example peas, beans, or particles of other vegetables of a nature to be easily recognized. When the patients are on a milk diet we often see clots of curdled casein. The ejected matters have a more or less disagreeable odor, especially if wine has not been excluded from the dietary; sometimes a sour butyric odor predominates. Rather commonly there is a more or less thick stringy mucus present, and sometimes we see traces of blood. The vomiting of black blood is a sign especially of cancer, that of red blood of ulcer. The symptoms are the same when the stricture is seated in the duodenum, but when it is located below the entrance of the common bile duct the bile flows back in abundance into the stomach. This is a rare symptom but one of extreme gravity, as we may well understand.

When vomiting does not occur spontaneously the introduction of the stomach tube in the morning brings out a considerable quantity of liquid and solid material such as we have just been describing.

This is what takes place clinically in cases of marked dilatation of the stomach caused by obstruction of the pylorus, by extensive lesions of the stomach wall, and, in certain rare instances, by advanced atony. The picture is somewhat different in cases of hyperchlorhydria and in paroxysmal atonic dilatation. Patients with hypersecretion of hydrochloric acid suffer from delayed pains coming on three, four, or five hours after eating. These pains wake them in the night and end in an attack of vomiting. The patients know so well that vomiting relieves the pain that they often provoke it artificially. The ejected material is stringy, glairy, usually slightly colored and of an acid odor, which is specially marked when wine has been taken. A thick yellowish deposit, made up of the remains of starchy food and of softened, undigested bread, collects at the bottom of the basin. Sometimes in consequence of the presence of bile the material has a bluish color. This copious vomiting of a greenish-blue matter is characteristic.

Some patients, suffering from nervo-motor dyspepsia with very pronounced gastric atony, have veritable paroxysms of dilatation. Others suffer from permanent stasis, with or without vomiting, as a result of some disappointment, prolonged mental anxiety, overwork, poor hygienic conditions, or of a diet unsuited to the condition of their stomach. This occurs also in various cachectic states, as in tuberculosis, anæmia, Addison's disease, chronic malaria, etc. These patients have heartburn, acid eructations, a tongue coated or red as if peeled, an acid taste in the mouth, a distaste for food, and for meat in particular. This marked distaste for food, combined with the cachexia, may lead to an error in diagnosis, especially in the more severe cases, when cancer of the stomach may be suspected.

In cases of marked dilatation, especially when vomiting is frequent, very obstinate constipation may be present. Sometimes there is diarrhœa caused either by a copious outpouring of fluid into the intestine, or by the discharge into the latter of the contents of the stomach.

Inspection of the abdomen is often of service in forming a diagnosis, and digital or total succussion may give us unequivocal signs of gastrectasia. In doubtful cases the passage of the sound and lavage of the stomach will decide the question as to whether the succussion sound is located in the stomach or in the colon. The method of making the patient take a large glass of water and then of listening for the succussion sound shows merely that atony and relaxation of the stomach exist, and is no proof of permanent dilatation. Sometimes, especially in cases of pyloric obstruction, we may note a projection of the abdominal walls corresponding to the dilated stomach, and we may even see the movements due to the peristaltic contractions of the organ in its effort to overcome the obstacle. Palpation will reveal the presence of an epigastric tumor if it exists. In doubtful cases we must not omit a systematic search for a displaced kidney.

To what extent is a patient with extreme dilatation poisoned by the toxic substances formed in his own stomach?

How important a rôle does auto-intoxication play in the causation of his symptoms? We know that Bouchard attributed a very great importance to these auto-intoxications, and he ascribed to their influence an almost infinite number of ills of various kinds, which we shall try to enumerate.

On the side of the liver we have congestion, and as a result of this a movable kidney displaced by the enlarged liver; on the side of the nervous system neuralgias, headache, cerebral weight, melancholy, insomnia, nightmare, vertigo, giddiness, and disorders of vision; on the side of the skin various eruptions; on the side of the respiratory organs, bronchitis, asthma, repeated attacks of coryza, and chronic pharyngitis; and on the side of the kidneys albuminuria or peptonuria. We see that the most prominent symptoms in this enumeration are those which may be attributed to neurasthenia and to arthritism, another form of hereditary neuropathy. A curious fact, and one of great importance in this connection, is that none of these symptoms, especially of the neuropathic class, is met with in cases of extreme dilatation of the stomach, of dilatation from mechanical obstruction at the pylorus (Charcot). Patients who have these symptoms are those on the borderland between motor atony and dilatation; a condition which is curable in the early stages but incurable later, when the muscle has been definitely stretched and when lesions due to gastritis have become established.

But does that mean that auto-intoxication has no influence in cases of dilatation of the stomach? Not at all. It is very probable that it contributes to the production of cachexia, which could not be accounted for by inanition alone. It explains without doubt the frequency in patients with dilatation of a sort of a chronic or recurrent indigestion as manifested by the anorexia and the unhealthy state of the upper digestive tract.

We must endeavor to restrict or suppress, if possible, the secondary fermentation which takes place in the material retained in the stomach. This fermentation is, in

any event, likely to cause local irritation, to produce gastritis, or to lead to a diminution in the secretion of hydrochloric acid and to incurable dilatation.

In considering the prognosis of this condition, we must examine successively and separately the different types grouped under the common term dilatation.

Cases of mechanical dilatation, due to lesion of the pylorus, can be relieved only by surgical operation removing or turning aside the obstacle. The chances of final cure are of course infinitely better when the lesion is a cicatricial one than when it is cancerous. Extreme gastrectasia, due to incurable atony or to degenerative lesions of the muscular tunics of the stomach, is almost as grave as cancer of the pylorus; we have not even the resource, which we have in pyloric stenosis, of gastro-enterostomy. There is nevertheless no actual contra-indication to a trial of this operation, even when there is no mechanical narrowing of the pylorus.

The condition of patients suffering from hypersecretion of hydrochloric acid with permanent gastric stasis is by no means reassuring. It has never yet been demonstrated that hyperchlorhydria of such an advanced degree is curable. These patients have to fear simple ulcer with all its consequences, mechanical dilatation with vomiting, and exhaustion from actual starvation. It is true that we have not been able to recognize this morbid condition for a long enough time to enable us to formulate anything definite as to its prognosis, and it is possible that a transformation of this affection into simple gastrorrhœa without hyperchlorhydria may be consistent with a very long life. We believe that we have seen cases of this kind.

Atonic neurasthenic dyspepsia terminates occasionally, though very rarely, in permanent dilatation. But by means of an appropriate diet, of medicinal treatment, and especially of gavage, we may often bring back these patients to a state of simple nervo-motor dyspepsia. A considerable amelioration not infrequently follows a few repetitions of lavage, as a result of which we may see the

stomach empty itself completely during the night, and its acidity, which had been more or less increased by the fermentation, return to the normal. In some of these cases there seems to be almost a resurrection, and patients have been cured whom everything appeared to condemn and in whom the diagnosis of cancer of the stomach was almost certain.

The treatment, although proceeding along the same general lines, will differ according to the clinical types that we have distinguished. In all cases, however, we must:

1. Reduce as far as possible the bulk of the food ingested.
2. Prescribe a dietary of such a nature that there will be the least possible chance for fermentations.
3. Assure, as far as we can, the passage of the food from the stomach into the duodenum in such a way as to permit always of the patient receiving sufficient nourishment.
4. Practise gastric antisepsis.
5. Combat the chemical dyspepsia.
6. Treat the constipation.

We shall see how to obtain these ends in examining seriatim the indications above formulated.

1. *Reduction of the Bulk of the Food.*—We must in these cases above all give food of great nutritive power, as finely divided as possible so that its admixture with the gastric juice may be most intimate and so that the amount of non-utilizable residuum may be reduced to a minimum. Milk, meat powder, and the farinas are especially to be recommended. The patients should take but a moderate quantity of fluid.

In cases of mechanical narrowing of the pylorus attended with uncontrollable vomiting it is well to give a certain quantity of water by enema. We may in this way bring about the absorption of from nine to twelve ounces of water in two or three divided doses.

When, in spite of this, a certain amount of gastric stasis persists, we must remove the residue mechanically by washing out the stomach. This lavage will have the advantage of lessening the tax upon the stomach and of

withdrawing the mucous membrane from the irritating contact of alimentary substances in process of fermentation. In cases of hypersecretion it has been advised to wash out the stomach in the evening at bedtime. This would give the organ a period of rest during the night and the mucous membrane would be spared for some hours the contact of an irritating liquid. Fearing that lavage might be an occasion of fatigue or of excitation for the stomach I have occasionally, especially in cases of hypersecretion, evacuated the stagnating liquid once a day, actually washing out the stomach only two or three times a week. In the case of patients who have become habituated to the use of the tube, this evacuation is easily accomplished; they have only to cough after the tube has been introduced in order to charge the siphon and empty the stomach without fatigue. After the tube has been introduced, we may take advantage of its presence to give meat powder, milk, or eggs, if this seems desirable.

In atonic dyspeptics in whom the stasis has not existed long and is not very pronounced, a few repetitions of the lavage will usually suffice to cure the stasis and at the same time to effect the disappearance of the organic acidity resulting from it. There are, as we have said, all grades between simple distention from nervo-motor atony and dilatation with permanent stasis and organic hyperacidity.

It is in this class of patients especially that the diet lists gotten up by various authors for cases of dilatation of the stomach will be found useful. Bouchard's dry diet deserves special mention. He gives two meals a day separated by an interval of nine hours, although occasionally he is obliged to permit a third meal. In this case the two principal meals are separated by an interval of seven hours, the bite in the morning preceding the larger meal by four hours. He allows but 375 grammes of liquid at each of the larger meals, that is to say, a pint and a half a day, no liquid being permitted at the smaller meal in the morning. The food should not be too fat, well-cooked meat or

boiled fish being given by preference. The patient should be restricted in his consumption of substances which are susceptible to fermentation, taking little sugar, and no alcohol or vinegar. Red wine is forbidden, only white wine or beer largely diluted with water being permitted.

Bread should be eaten sparingly, and what is taken should by preference be toasted so as to destroy any yeast spores which may have survived the baking of the bread in the first instance. For the first breakfast the patient may take a boiled egg and some stewed fruit or marmalade, but no bread or liquid.

The following articles may be taken at the second meal: Cold meats, rather well done; hot meat, but stewed in preference to rare roasts; boiled fish; soft boiled eggs, eggs in milk; milk preparations in more or less solid form; rice in milk, bouillon, or meat juice; vegetable purées, which are wrongly thought to increase flatulent dyspepsia; cheese, and stewed fruit.[1]

The pint and a half of liquid which Bouchard allows is not sufficient for all patients. It is much better, we think, to order only hot drinks; the patients are not tempted then to drink so much as they are when cold beverages are permitted, and the heat has the useful property of stimulating the smooth muscular fibres of the stomach walls to contraction.

The following is the diet list drawn up by Rosenheim for cases of dilatation of the stomach. He is, as this shows, in favor of small but frequent meals:

6 o'clock—100 gm. of tea, 50 gm. of bread, one egg.
9 o'clock—100 gm. of meat jelly, 50 gm. of biscuit, 10 gm. of butter, a small glass of sherry.
Noon—150 gm. of beefsteak, 100 gm. of well-cooked rice, or some other vegetable, 150 gm. of red wine.
3 o'clock—50 gm. of white bread, 200 gm. of milk.
6 o'clock—100 gm. of white bread, 50 gm. of cooked smoked meat, 20 gm. of butter, 100 gm. of red wine.
9 o'clock—100 gm. of tea, 100 gm. of biscuit.

[1] "Leçons sur les Auto-intoxications dans les Maladies," p. 189 *et seq.*

This diet, in our opinion, is better suited to neurasthenics with atonic dyspepsia than to cases of dilatation properly speaking. It is less necessary to adhere to the strict letter of this dietary than to follow the general principle of small meals composed in such a way as to preserve the proper ration of maintenance. The red wine might be advantageously replaced by white wine or light beer, or by hot drinks, weak grog, etc. We must not forget that some persons are not affected pleasantly by tea in the evening, as it is liable to keep them awake.

2. *The Giving of Food which is Least Liable to Undergo Fermentation.*—This end is attained by a dietary such as we have just mentioned. (See the sections on Diet and Gastro-intestinal Antisepsis).

3. *To Secure the Passage of the Food from the Stomach into the Duodenum.*—This can be effected medically in only one way, viz., by increasing the force of the muscular contractions of the stomach. We must resort for this purpose to some of the agents which we enumerated above in the chapter on nervo-motor dyspepsia, such as ipecac, tincture of nux vomica, electricity, massage, hydrotherapy, etc. We can hope for success, of course, only in those cases in which there is no mechanical obstruction at the pylorus, or in which the muscular wall of the stomach is not too extensively involved in the lesion or thinned by the long-continued distention. When there is a diffuse lesion of the walls of the stomach the merely palliative measures, diet and lavage, may be of some use. In the case of an organic lesion of the pylorus there is still one resource—surgical intervention. This is only palliative in the case of cancer, but may be actually curative when there is a simple fibrous contraction of this orifice.[1] We cannot stop here to speak of the surgical treatment of stenosis of the pylorus, and must content ourselves with a word or two concerning the different methods employed and their indications.

[1] A. Guinard: "Traitement Chirurgical du Cancer de l'Estomac."

In order to have any hope of success in operation for cancer of the stomach we must perform it early while the lesion is still very limited and before any secondary adenopathy has appeared. Unfortunately a diagnosis at this stage is hardly possible, and when the tumor can be made out it is so extensive that its removal by pylorectomy is a difficult matter; the operation is then more dangerous in itself and its results are very problematical. A return of the disease occurs in general at the end of some weeks or months, and the patient has then been exposed to the very real dangers of a grave operation without adequate compensation.

Gastro-enterostomy, that is to say the establishment of an artificial communication between the stomach and the intestine, passing by the obstruction, gives much more satisfactory results. The pain is relieved, the vomiting ceases, feeding again becomes possible, and the patient regains his strength; there seems even to be a period of arrest in the progress of the disease. Nevertheless the latter continues its evolution, and although the patient does not succumb to the results of an obliteration of the pylorus, he does perish in consequence of the ravages of the cancer.

The results of operation are much more favorable when the stenosis is fibrous and non-malignant in character. In such cases dilatation with or without opening of the stomach, pylorectomy, and also gastro-enterostomy have been performed. The latter is the operation to be preferred; it is the most easily performed and is attended with fewer dangers during and after the operation. The clearest indication for surgical intervention is offered by pyloric stenosis with dilatation of the stomach, occurring as a consequence of the cicatrization of a simple ulcer.

4. *Antisepsis of the Stomach.*—One indication which must be met in dilatation of the stomach is the restriction of intra-gastric fermentation. Several of the procedures which we have already mentioned have as a secondary consequence a diminution of the fermentative processes

and prevention of auto-intoxication. Among these are the reduction in the quantity of the food, the elimination of all that might not be digested and thus remain in the stomach, the proscription of substances already fermented or which are eminently putrescible, the removal of the stagnating material by the tube, and finally lavage. Medicinal antisepsis will be treated of by itself in a subsequent chapter.

5. *Management of the Chemical Dyspepsia.* — The chemical state of the dilated stomach varies in the different cases. In some there is hyperchlorhydria with hypersecretion, and in others a diminution in the amount of hydrochloric acid with or without the acidity resulting from fermentation. When there is excessive secretion of hydrochloric acid we must, of course, meet the primary indications of this variety of dyspepsia, viz., diminution of the gastric irritation to a minimum, neutralization of the excess of acid by alkalies in large dose, etc.

In cases of reduced secretion of hydrochloric acid, should we try to stimulate the mucous membrane to more abundant secretion, or to replace the missing acid artificially? We may note in passing that the means employed to tone up the muscle stimulate at the same time the glands of the mucous membrane. Hydrochloric acid is not of much use in cases of cancerous narrowing of the pylorus with consecutive dilatation of the stomach, and may well be dispensed with; indeed, there is reason to believe that we shall do better by alkalinizing the contents of the stomach so as to suppress the digestive process in the stomach entirely. Indeed, it happens almost constantly that the epigastric pains are relieved by the operation of gastro-enterostomy, which is doubtless to be explained by the fact that the current of the gastric juice is turned away so as not to come in contact with the ulcerated surfaces. It might be advisable to endeavor to bring about the same result in cancer, when the pains are troublesome, by the administration of alkalies in large doses. Indeed, we have done this occasionally with advantage. We ought also to avoid

giving hydrochloric acid when there is any suspicion of an uncicatrized ulcer.

The principal indication for hydrochloric acid is intermittent atonic dilatation, especially when there is excessive fermentation with organic hyperacidity. Fifteen or twenty drops may be given in two or three divided doses, or one or two wineglassfuls of a 0.4 per cent solution may be prescribed one and two hours after meals.

6. *Treatment of the Constipation.*—Patients with dilatation suffer almost always from constipation, resulting probably from the fact that an insufficient quantity of water reaches the intestine. This condition should be treated chiefly in a mechanical way, by means of suppositories, enemata, massage, and electricity. We should avoid putting into the stomach purgative remedies which would simply be retained there and fail of the desired effect, while adding to the amount of stagnating material in this already overburdened organ.

CHAPTER IV.

TREATMENT OF THE PAINFUL PHENOMENA IN DISEASES OF THE STOMACH AND INTESTINE.—TREATMENT OF THE GASTRIC AND INTESTINAL CRISES.

THE principal indication in the treatment of the pains depending upon a morbid condition of the stomach and intestine is to suppress the pathogenic cause. Thus by neutralizing the hyperacidity we overcome the pain resulting from it. This result is particularly noticeable in cases of hyperchlorhydria; the exhibition of alkalies in large doses suppresses the pain more promptly and effectually than all the narcotics which we could administer. The same result is obtained when alkalies are given in simple ulcer; the pain is relieved and at the same time the progress of the disease is arrested by the prevention of auto-digestion. Indeed, whenever an ulceration of the stomach exists, whatever its nature, it is proper to neutralize the gastric juice and thus suspend its corrosive and irritant action.

Constipation is often the cause of severe colic located in the large intestine, especially when there is muco-membranous enteritis; in such cases it is the constipation especially which calls for treatment. Sometimes a hemorrhoidal condition is present which must be treated in order to relieve the enteralgia.

Unfortunately we cannot always discover or reach the cause of the pain, and sometimes the phenomena are purely nervous in character, so that we are obliged to treat the element of pain directly. We are also occasionally obliged to have recourse to narcotic medication, even when it is possible to institute a causal treatment. This is an empirical and secondary, although important, treatment,

when there is some evident anatomical or chemical cause for the pain residing in the disease itself; but it becomes the principal thing when the cause escapes our means of investigation, or when the pain seems to be purely neuralgic in character.

The reader will find elsewhere, either in the part devoted to dyspepsia or in that treating of organic diseases with evident lesions, a discussion of the pathology of these symptomatic pains. We shall in this place review briefly the other gastro-intestinal pains, such as gastralgia, enteralgia, and the gastric and intestinal crises.

Gastralgia.—The domain of gastralgia, formerly so extensive, has been greatly narrowed as a result of modern research. We must withdraw from it tye painful paroxysms occurring in hyperchlorhydria and the crises of locomotor ataxia. The unpleasant sensations, hardly painful, of weight and of epigastric pressure, so frequent in patients suffering from simple nervo-motor dyspepsia, do not really deserve the name of gastralgia.

Gastralgia is a painful cramp of the stomach, coming on at no definite period after eating. This pain which is sometimes very severe, is eased by pressure at the pit of the stomach. Occasionally accompanying this pain is a very marked feeling of depression, amounting almost to syncope; the face is pale, anxious, and sometimes covered with a cold sweat. The pains are not relieved by the ingestion of food or drink, being thereby distinguished from those occurring in hyperchlorhydria. These painful crises, so capricious in the time of their appearance, are met with especially in the chlorotic, the hysterical, and in women with movable kidney, who may or may not have previously suffered from the violent gastric crises with vomiting which we shall describe later on. They may also occur in the neurasthenic or in those of the rheumatic diathesis.

Enteralgia is not so well recognized as gastralgia. Germain Sée, having observed that the pain in many cases of dyspepsia did not occur until three or four hours after

meals, came to the conclusion that their real seat was in the intestine. There is no doubt that colic may occur in these cases, but still we must remember that late pains in the stomach occur in cases of hyperchlorhydria.

Enteralgia is a sharp pain, characterized by the patient as colic, spasm, or a burning sensation, following the course of the transverse colon or sometimes almost completely encircling the abdomen, like the colon itself. These crises are occasionally extremely painful; they may continue for hours or even for days. Frequently they come on rather late at night, between two and three o'clock in the morning. The patient is bent almost double, compressing the abdomen with his forearms; his condition is at times one of extreme distress and anxiety.

At times we see movable prominences on the abdomen due to the spasmodic contraction of the muscular tunics of the intestine. These elevations are readily displaced and are seldom found in the same location in two consecutive attacks.[1] Occasionally exaggerated peristaltic movements may be seen through the abdominal walls, and gurgling or rumbling noises may be heard (the tormina nervosa of Kussmaul). Similar crises are common in patients with muco-membranous colitis and hemorrhoids. Sometimes the pains radiate toward the sides of the chest, the loins, or the vertebral column.

Cherchewski[2] has seen analogous crises which were manifested by rectal tenesmus and a peculiar appearance of the fæces which looked as though they had been passed through a gauge-plate or were in the shape of little oval balls.

The intensity of the pain and the retraction of the abdomen have occasionally led to a diagnosis of lead colic. Vomiting is absent, however, in these cases, and when this symptom is present we are led to suspect an actual occlusion of the intestine.

[1] G. André: "Les Névroses de l'Intestin," Gazette Hebdomadaire, December 17th, 1892.

[2] Revue de Médecine, October and December, 1883.

Spasm of the intestine plays an important part in the mechanism of this form of enteralgia, and it is possible indeed that the pain may be at times of purely spasmodic causation. A proof of the irregularity and exaggeration of the intestinal peristalsis is found in the borborygmi, which are perceptible both to the eye and to the hand, and also in some cases by knots forming along the course of the bowel. The crisis may terminate in an alvine evacuation. In rare instances fæcal matters are ejected by the mouth, an indication of very intense anti-peristaltic action.

Gastric Crises.—It is to Charcot[1] that we owe our knowledge of the gastric crises which occur most frequently in locomotor ataxia, but which are also seen in other cerebro-spinal diseases, such as general paralysis, *sclérose en plaques*, subacute or chronic central myelitis, etc.

Crises of tabes, which like the lancinating pains and the visual disturbances are frequent in the pre-ataxic period, manifest themselves in typical cases in the following way. Patients begin by having fulgurating pains in the lower extremities, sometimes also in the upper, girdle pains, and finally an acute pain in the epigastric region which is occasionally so severe as to find expression in loud cries. Vomiting then occurs, not preceded by nausea, but with a gush; the ejected matters consist at first of débris of food, then become glairy, and finally bilious. The vomiting puts an end momentarily to the paroxysm, but the pain reappears after a longer or shorter period of absolute freedom. There is a hypersecretion of hydrochloric acid during the crisis, as has been stated by Sahli and other observers, but hyperchlorhydria is rare in these conditions, and I myself have seen it but once in some ten or more cases. There is no reason, therefore, for giving alkalies in large doses indiscriminately in all cases of this kind. I have found, indeed, in several cases that the vomited matters were alkaline, the result, no doubt, of a

[1] "Leçons sur les Maladies du Système Nerveux," 2d edition, vol. ii., page 32. "Leçons du Mardi," page 331, 1888–89.

reflux into the stomach of the intestinal contents, and especially of the bile.

The crises may last, in this way, with exacerbations and remissions, for several successive days. Eating is impossible during their continuance, but as soon as the pain has ceased, which it does suddenly, the patient begins to eat again as if nothing had happened; there is no anorexia and digestion is well performed. These intervals of perfect freedom from pain and the rapid termination of the crises are points of value in the diagnosis.

The gastric crises of locomotor ataxia vary greatly in their course and in their intensity. Charcot distinguishes the following clinical varieties:

1. They may be of unusual intensity and reduce the patient to a dangerous condition of collapse.

2. The pains are occasionally "crampoid" in character and are unattended with vomiting. These are the mild crises, well described by Fournier as occurring in the preataxic stage of tabes, *crises à sec.*

3. Vomiting may be profuse and pain but slight.

4. The crises may recur every day.

5. They may be of long duration, lasting fifteen, twenty or thirty days or more. In one doubtful case, reported by Buzzard, the crises are said to have lasted for nine months.

Gastric crises, absolutely resembling those of tabes, but occurring in simple neuropathic cases, independent of any medullary lesion, have been noted by various authors (Leyden, Debove, Rémond).[1]

Charcot doubts the reality of these essential crises. He thinks that they properly belong to the pre-ataxic period of tabes, and that the patients in whom they were observed were destined eventually to become tabetic. We have, however, seen veritable crises of pain and of vomiting in women suffering from movable kidney.[2]

[1] "Ueber periodisches Erbrechen," Ztsch. f. klin. Med., Berlin, 1882. Société Méd. des Hôpitaux, January 23d, 1889. "Des Crises Gastriques Essentielles," Arch. Gén. de Méd., July, 1889.

[2] "Les Crises de Vomissement chez les Malades atteints de Rein Mobile," Société Médicale des Hôpitaux, October 21st, 1892.

These crises may resemble in every respect those of locomotor ataxia; they may be more or less intense and more or less prolonged, and there may be painful crises without vomiting. The exciting causes of the attacks are mental emotions of various kinds and overwork; it is important to bear these causes in mind with reference to the treatment. They come on very commonly during the menstrual period. Attacks of this nature are far from being rare; I have seen fifteen cases in the past two years. In purely neuropathic gastric crises, associated or not with movable kidney, there is hypersecretion with acid vomiting, resembling indeed acute hyperchlorhydria.

Intestinal Crises.—Fournier has drawn special attention to intestinal crises occurring in locomotor ataxia, and has described intestinal tenesmus and tabetic diarrhœa. Tenesmus is characterized by urgent and frequent desire to defecate, although but little is passed at stool. We shall describe tabetic diarrhœa in a subsequent section.

In the following review of the various agents employed for the relief of gastric and intestinal pain, we shall point out the special indications for their use in individual cases. It is well to note that most drugs which have a sedative influence in pain are also capable of reducing the exaggerated motor excitability, spasmodic condition, vomiting, and the gastric crises. In pointing out, therefore, the treatment for the gastric crises, we shall indicate in its essential features that suitable for the vomiting.

Opium and its Derivatives.—Opium has long been employed in the treatment of pains in the stomach. In cases of painful dyspepsia Trousseau used to give a very small quantity of laudanum, beginning with one drop, at the commencement of a meal; his object was to reduce the sensibility of the stomach without prejudice to its movements. Black drop has also been given in the same way and for the same end, and Dujardin-Beaumetz considers it an excellent remedy for the pain. One must not forget in giving this preparation that it is much more active than Sydenham's laudanum. The preparation is twice as rich

in opium as Rousseau's, and four times as rich as Sydenham's laudanum.

Paregoric is much less rich in opium, containing but four parts to the thousand, so that there is only about one-twelfth of a grain in twenty drops. The vinegar and tincture of opium are most frequently taken before meals when the object is to relieve the pain occurring during digestion. The crude drug in powder is also used sometimes for the same purpose; it is frequently incorporated in alkaline or absorbent powders such as bicarbonate of soda, calcined magnesia, prepared chalk, or subnitrate of bismuth. The following formulæ will be found useful:

℞ Prepared chalk,
Bicarbonate of soda, ... āā gr. viij.
Powdered opium, ... gr. ½.
M. For one powder. Two or three may be taken at the beginning of a meal.

℞ Magnesia,
Bicarbonate of soda, . . . āā gr. viij.
Powdered opium, ... gr. ½.
M. For one powder. To be taken in the same way as the preceding.

These formulæ are especially useful in cases of slight hyperacidity with true hyperæsthesia of the mucous membrane.

Opium is an excellent remedy for the intestinal pains, for colic especially. It may be taken in the form of extract, of powder of the crude drug,[1] of laudanum, or of paregoric, according to the age of the patient and the special indications. Paregoric, which is easy to take, is particularly serviceable in the case of infants because of the small proportion of opium which it contains. Laudanum may be given by enema in those cases in which vomiting is so persistent as to render its administration by the mouth difficult.

Morphine.—This alkaloid is often useful in cases of

[1] The extract of opium is double the strength of the crude drug.

acute pain, that of gastric crises for example. It may be given in solution or hypodermically, though its employment in solution is somewhat out of date. Gallard has devised a formula which he calls "white drops," and which is used in much the same way as the black drop. The following is the formula:

℞ Hydrochlorate of morphine, . . . gr. vi.
Cherry-laurel water, ... ʒ v.

A small dose of this solution, one or two drops on a lump of sugar, is given at the beginning of a meal. This preparation is very much weaker than the solution used for hypodermic injection, a dose of 2 drops containing only about $\frac{1}{25}$ grain of morphine. Two or three times the amount advised by Gallard may be given if desired.

When used to combat these gastro-intestinal pains morphine is usually employed in hypodermic injection. It is an excellent remedy in very acute pain, in round ulcer, and in gastric crises, especially when vomiting is present. At the beginning, before the individual tolerance of the patient is known, it should be given in small dose ($\frac{1}{12}$ to $\frac{1}{8}$ grain). Recourse should be had to morphine only in cases of real necessity, and its use should be abandoned as soon as possible. The special reason for this is that patients with gastric pains are often neurotics who are more exposed than others to the danger of contracting the morphine habit.

Opium and morphine are also particularly indicated when there is a tendency to diarrhœa, and in cases of insomnia. It may be noted that we have not recommended any preparations in the form of syrup. This is because sugar is not, as a rule, suited to dyspeptics, and it is therefore better to use other pharmaceutical forms of administration.

Belladonna.—Trousseau used to think highly of belladonna for the relief of pains in the stomach and intestine. He gave the extract in initial doses of $\frac{1}{6}$ grain. This is exhibited in pill form made up with an equal amount of

the powdered leaves. It acts well in some cases, especially when constipation is present.

Chloroform Water.—This is prepared most simply by adding two teaspoonfuls of chloroform to a pint bottle of water. The mixture is shaken several times during twenty-four hours, and the water is then decanted from the undissolved chloroform at the bottom of the bottle. This saturated solution of chloroform, recommended by Lasègue, is sometimes but not always an efficient sedative of the pain and vomiting. It is usually better to dilute it with an equal quantity of pure water, as it is apt in full strength to cause a burning sensation in the œsophagus when swallowed. It has the advantage that it can hardly be taken in overdose, and it may be given in quantities of from 3 to 5 tablespoonfuls every ten minutes during a period of from one-half to one hour. It may also be employed as a menstruum for a number of medicinal substances. In cases in which it acts well it is a very valuable remedy.

Sulphide of Carbon.—A saturated solution of sulphide of carbon may be prepared and used in the same way as the preceding; it has been recommended by Dujardin-Beaumetz.

Hydrochlorate of Cocaine.—The anæsthetic effect which this drug exerts upon the mucous membranes has been utilized in painful affections of the stomach, often with good results. Dujardin-Beaumetz prescribes it in a solution containing 2 grains to 3 ounces of water, of which he gives 2 tablespoonfuls every two hours. He says that as much as 7 or 8 grains of the salt may be taken in this way in the course of twenty-four hours without danger. We prefer to give much smaller doses, using a solution of only ½ grain to 3 ounces, of which not more than 1½ ounces is taken in tablespoonful doses during the day. It should not be forgotten that very dangerous symptoms of acute poisoning have followed the exhibition of a single dose of ¾ grain of cocaine.[1] Of this

[1] Luther: Therapeutische Monatschrift, February, 1893, page 92.

weaker solution a tablespoonful may be given every fifteen minutes for an hour, the administration of the remedy being then discontinued until the pains reappear.

Extract of Cannabis Indica.—In a general way we may say that cocaine is stronger than chloroform water and cannabis indica is stronger than cocaine. The extract of cannabis indica is an excellent sedative for gastric pain; it is recommended by Germain Sée in daily doses of $\frac{3}{4}$ grain. We begin usually with $\frac{1}{3}$ grain and rarely exceed $\frac{1}{2}$ grain. The following formula is useful:

℞ Extract of cannabis indica, . . . gr. $\frac{1}{8}$
Alcohol, . . . q. s. to make a solution
Water, ... ℥ v.
M. Sig. The entire amount to be taken in the twenty-four hours.

Extract of cannabis not only relieves the gastric pains, but is an excellent analgesic in general. It acts well in the lancinating pains of tabes, in the various indefinite pains of neurasthenics, etc. Even when given in doses of $\frac{1}{3}$ to $\frac{1}{2}$ grain a day, its effects must be carefully watched, for occasionally, after a few days' use, slight symptoms of acute hasheesh poisoning declare themselves; such are fits of musing, hallucinations occurring in a half-waking state, nightmare, etc. It would not be prudent to continue the use of the drug longer in cases in which there is any imperfect action of the kidneys.

Solanine.—Desnos has experimented with this drug,[1] and has noted very marked sedative effects in a variety of painful affections of the stomach. He gave it in pill form in daily doses of $\frac{3}{4}$ to $1\frac{1}{2}$ grains, rarely exceeding 2 grains.

Chlorodyne.—This preparation, of unknown composition, enjoys a great reputation in England as a remedy for gastralgia, and is considered as an indispensable travelling companion by numbers of English and Americans. Several different formulæ have been published as representing its composition (see Appendix), but the active ingredients are evidently chloroform and morphine.

[1] Bulletin Général de Thérapeutique, vol. cxxii., p. 352.

We have less confidence in the following medicaments than in those which we have enumerated in the earlier part of this section:

Ether.—This is much less efficacious than chloroform water. Nevertheless it may do good service in the case of very nervous individuals or of hysterical women, when given in doses of 10 to 20 drops in sweetened water.

Menthol.—This substance may occasionally be found useful, especially when vomiting is troublesome. It may be given after the following formula:

℞ Menthol, ... gr. iss.–ij.
Alcohol, . . . q. s. to make a solution.
Distilled water, ... ʒ vi.
M. Sig. To be taken in tablespoonful doses.

The drug may be taken in much larger doses than these (see Appendix).

Condurango.—Dujardin-Beaumėtz speaks well of this substance. It may be given in powder in doses of 15 grains at each meal; in alcoholic solution (1:5) in doses of 2 teaspoonfuls at each meal; or in the form of fluid extract in 20-drop doses after eating. We have never tried it.

Nitrate of Silver.—Singular as it may appear at first sight, Rosenheim[1] has found nitrate of silver an excellent sedative in cases of exaggerated sensibility of the mucous membrane of the stomach. He gives 2 teaspoonfuls in a half-glassful of water three times a day of a solution containing 3 to 4½ grains to 3 ounces of distilled water. The first dose is taken fasting, the others after breakfast and dinner.

Antipyrin.—This excellent nervous sedative seems to have the disadvantage of acting as an irritant to the gastric mucous membrane, and it should therefore be employed cautiously in all cases of dyspepsia, especially if gastritis is present. It is best given in combination with bicarbonate of soda, and may also be administered by the

[1] "Krankheiten der Speiseröhre und des Magens," p. 288.

rectum. The best results from the use of the drug are obtained in cases of gastric crises, and it is known to be a useful remedy for the painful crises of locomotor ataxia. From 8 to 45 grains may be given, but it ought always to be administered in small dose and with caution in the case of persons who take it for the first time, for instances of idiosyncrasy in respect to its action are quite common.

The Bromides.—All the bromides, even more than antipyrin, have the disadvantage of acting as irritants to the gastric mucous membrane. Germain Sée has recently recommended the bromide of calcium as a sedative in all cases of stomach pains; he prescribes it in doses of from 30 to 45 grains in the same way as bromide of potassium.

We may conclude this review by mention of certain physical remedies, such as hot applications, baths, electricity, and counter-irritation.

Hot Applications, Baths.—The sedative effect of heat, especially moist heat (compresses or poultices) applied to the abdomen is well known and we may always avail ourselves of it. Hot baths have also a very soothing action, and may be prescribed with advantage in the case of patients who are able to bear them, seeming to be of particular efficacy in gastric crises.

Electricity.—Several writers have spoken of the good effects of electrization in the treatment of painful affections of the stomach. Leube has obtained excellent results from a continuous current in gastralgia,[1] and Burkhardt has derived benefit from faradism.[2] Max Einhorn,[3] the inventor of a special apparatus for intra-gastric electrization, has also noted the disappearance of stomach pains under the influence of this mode of treatment. The following are the conclusions which Ravé has formulated as the result of investigations conducted in Hayem's service: "The painful phenomena are, in a general way, re-

[1] Ziemssen's "Handbuch," vol. vii., p. 205.

[2] "Neurasthenia gastrica," Bonn, 1882.

[3] N. Y. Medical Record, May 9th, 1891, and January 30th and February 6th, 1892; N. Y. Medical Journal, July 8th, 1893.

lieved by the judicious employment of the constant current; but we must make an exception in regard to the crises which this treatment may provoke in cases of hyperchlorhydria." This exception is justified by the fact which has been shown by Ravé and by Hoffmann,[1] that electrization of the stomach increases the gastric secretion. It would hardly be prudent to apply electricity to the pneumogastric nerve, as some have proposed, for the consequences might be unpleasant as regards the action upon the heart.

The patient sometimes objects so strenuously to the intragastric method of electrization that Ziemssen now uses external treatment only, applied by means of broad electrodes. Faradism may be employed by preference in patients in whom there is great relaxation of the abdominal muscles and constipation.

Counter-irritation.—Revulsion is sometimes useful in the treatment of gastralgia. It may be obtained by means of sinapisms, sprays of methyl-chloride, or small blisters. We believe that the effect is produced chiefly through suggestion, for which reason it is better to employ some very superficial form of irritation which will not involve the skin to any great extent. The actual cautery should never be used, and it is a serious error to produce any real lesion of the integument by means of it.

We will close this chapter with some remarks as to the special form of treatment best adapted to the relief of each of the varieties of gastro-intestinal pain.

Pains Symptomatic of Dyspepsia.—Alkalies in large doses are the best means of overcoming the pains due to hypersecretion of hydrochloric acid. Nevertheless, in cases in which marked hyperæsthesia of the mucous membrane exists, recalling veritable paroxysmal crises, it will be well to have recourse to sedatives. Hot drinks are often useful for this purpose. Among the medicinal sedatives we would give the preference to opiates, cocaine, and

[1] Berliner klinische Wochenschrift, Nos. 12 and 13, 1889.

especially to extract of cannabis indica. We ought not to think of employing antipyrin or electricity because of the irritation which they cause to the mucous membrane. Hot baths and hot douches often have a favorable effect. They should be given whenever possible in the evening, in order to produce quiet and give the patient sleep at night. In simple nervo-motor dyspepsia, without any tendency to organic hyperacidity, we may use black drop, Gallard's white drops, or laudanum in very small doses at the beginning of a meal. Hot drinks are especially useful in these cases, since they increase the movement of the stomach at the same time that they relieve the pain. Of course the diet and medicinal treatment should be carried out in the way we have indicated above. We may also use in these cases chloroform water, which is a good antiseptic and is therefore indicated in cases of fermentation with organic hyperacidity. When there is dilatation, lavage will be found an effective remedy against pain. Counter-irritation finds its application especially in chronic gastritis, in round ulcer, and in the gastralgia of neurotics and the hysterical.

Gastralgia and Gastric Crises.—In cases of very severe gastric crises, with or without vomiting, absolute rest is indicated. This is always useful and is indispensable when there is a movable kidney. In the way of medicinal sedation we may give cannabis indica, chloroform water, cocaine, or hypodermic injections of morphine. Relief may sometimes be obtained by hot baths or electricity applied to the abdomen. Absolute rest and hot drinks are the best remedies in certain cases of crises with hyperchlorhydria.

Intestinal Pains.—The colic which accompanies diarrhœa should be treated by opium or morphine, given by the mouth or rectum. In cases of chronic colitis remedies should be administered preferably by enema. Hot applications are also frequently of great benefit. Opium has the disadvantage, in cases of muco-membranous colitis, of increasing the constipation which is in reality the cause

of the whole trouble; belladonna, as recommended by Trousseau, is therefore to be preferred in this condition. Cherchewski has also employed it in cases of intestinal crisis with good results. When constipation is present, the application of electricity, especially of faradism to the abdomen, is indicated.

CHAPTER V.

VOMITING.

VOMITING occurs as a symptom in so many different conditions that we cannot attempt even to enumerate them here, and must content ourselves with the general indications for treatment of the symptom considered apart from the morbid condition of which it is the expression. Any special indications which may exist in individual cases will be found discussed in the several sections devoted to the therapeutic management of the different diseases in which vomiting may occur.

Ice is frequently employed with success; it should not be allowed to melt in the mouth, but should be swallowed in small fragments at successive intervals. We have often arrested the vomiting in cases of tuberculosis by causing the patients to swallow little pieces of ice immediately after eating. Cold acidulated drinks, effervescing lemonade, and champagne are likewise useful in many instances. The employment of Rivière's potion is classical;[1] it should not be given in cases of round ulcer on account of the dangerous distention of the stomach which the carbonic acid might occasion.

All the agents which are useful in relieving pain may be employed to arrest the vomiting; among these are chloroform water, cocaine, cannabis indica, and morphine by the mouth or hypodermically. Menthol has recently

[1] The "effervescing draught" of the French Codex consists of two solutions, which are mixed in equal parts when used and drank during effervescence. The first contains 2 parts of potassium bicarbonate in 15 of syrup and 50 of water; the second contains 2 parts of citric acid in 15 of syrup of lemon and 50 of water.

been recommended very highly in cases of obstinate vomiting. It may be given according to the following formula:

℞ Menthol, ... gr. xv.
Alcohol, ... ʒ v.
Simple syrup, ... ʒ i.
M. Sig. A teaspoonful every hour.[1]

Lasègue has found tincture of iodine, given internally in iodide solution, of service. We may also try nitrate of silver, as advised by Rosenheim for the relief of hyperæsthesia of the mucous membrane. For vomiting of pregnancy the oxalate and the valerianate of cerium have been recommended.

In cases of nervous vomiting we may also make use of counter-irritation in the form of sinapisms and blisters to the epigastrium, sprays of ether or of methyl-chloride, or electricity. Electrization of the pneumogastric in the cervical region has also been recommended, but we must confess that we should hesitate to employ this remedy. We should prefer faradization by means of the electric brush. Static electricity and the electric bath may be tried. In cases of hysteria and of neurasthenia the physical remedies are especially advisable. For the former we might have recourse to suggestion.

Lavage would be indicated in cases of stagnation of food in the stomach with acid fermentation. Forced feeding through the stomach tube sometimes succeeds when all other means have failed. It is an heroic measure to which we may turn in cases of need when no contra-indication exists to its employment (Debove).

[1] Wins, quoted by Soulier: "Traité de Thérapeutique," vol. ii., 294.

CHAPTER VI.

DISORDERS OF THE APPETITE.

THE appetite may be increased or diminished. Bulimia or exaggeration of the appetite is of uncommon occurrence except in diabetes and in convalescence from acute diseases. It is met with also in some cases of hypersecretion of hydrochloric acid; these patients are gluttonous and swallow their food without masticating it sufficiently. Outside of the condition above mentioned, bulimia is found chiefly among neurotics. It is to be treated by large doses of opium, extract of valerian (in gradually increasing doses from 1 to 2½ drachms), and by antipyrin.

A diminished appetite will be benefited in the ordinary cases by the local and general treatment directed against the dyspepsia; climatotherapy, hydrotherapy, and massage are especially useful.

Among the medicinal substances used to promote the appetite the bitters, such as gentian, quassia, and nux vomica, have long enjoyed a high reputation. These bitters should generally be given a little while before meals, but it is better to take tincture of nux vomica and *gouttes amères de Baumé* (a tincture of St. Ignatius bean—see Appendix) immediately before meals, or sitting down to the table. We prefer to prescribe the bitter tinctures after meals, while digestion is in progress. Infusion of quassia is inoffensive and may be taken fasting without trouble, but this is not the case with the vinous or alcoholic preparations, which in the course of time induce secretory exhaustion of the mucous membrane, or even lead to actual gastritis. We must regard as specially dangerous in this respect all those preparations advertised under the falla-

cious appellation of appetizers. There is a large consumption of them in these days, but all of them, whatever name they go by, are as injurious as absinthe, and as likely to lead to gastritis or to that particular form of intoxication by essences which Lancereaux so justly distinguishes from alcoholism.

Wine of gentian or of calumba and similar preparations should be taken during digestion. Beer taken with the food is a good appetizer. The appetite is also increased by hydrochloric acid in small doses; this effect is seen especially in the dyspepsia and anexoria occurring in tuberculosis.

In some cases of neurasthenia the patients acquire a veritable disgust for food, and instances are related of persons thus affected who have died apparently of simple inanition from not eating enough. It is in these grave cases that we must resort to the Weir-Mitchell method of treatment. Feeding by the stomach tube is often of the greatest service; the patients are brought out of their depressed condition, regain their strength, and acquire a taste for food again. Isolation, with or without forced feeding, is also the best means of treating hysterical anorexia, which is due in most part to a perversion of the will.

Dujardin-Beaumetz regards arsenic as the best remedy for simple loss of appetite; it may be tried in the milder cases of the class we have just been considering, in those who are still able to attend to their affairs, to travel, etc.

Orexine hydrochloride, a preparation lately introduced, appears to be of little value, certainly much inferior in its action to hydrochloric acid.

CHAPTER VII.

CONSTIPATION.

Definition.—It is as difficult to define constipation as it is to say what is diarrhœa. As will be seen, we shall define diarrhœa as consisting in the elimination of an excessive quantity of fluid by the intestine. Constipation is exactly the opposite condition. It is the stagnation in the bowel of fæcal matters which undergo a more or less marked degree of desiccation. This definition excludes those cases in which there is, as occurs sometimes in cholera, a sort of internal diarrhœa. Very soft, even liquid matters are retained in the intestine, but one cannot logically say that there is constipation. The retention may be incomplete, a part only of the fæcal matter being evacuated; or the liquid matter may force a channel through the hardened scybala. Sometimes diarrhœic attacks occur, but these are cases of false diarrhœa behind which real constipation exists. All that is perfectly reconcilable with the definition which we have proposed.

Writers have classified constipation under different varieties according to their causes, symptoms, and consequences. None of these classifications is entirely satisfactory and we shall not trouble ourselves much with them, following the one by preference formulated by Dujardin-Beaumetz. This author groups the different forms of constipation under the five following heads:

1. Constipation due to a mechanical obstacle.
2. Constipation of alimentary origin.
3. Absence of secretion of the intestinal juices.
4. Diminution of the muscular contractility.
5. Constipation resulting from disordered sensibility of the rectum, under which we distinguish two sub-varieties:

(*a*) Anæsthesia (as in certain diseases of the spinal cord, transverse myelitis, etc.).

(*b*) Painful spasm of the sphincter.

This classification is perhaps the best that we have. But it is based on pathogeny, and the objection may be raised that it brings together forms of the affection which differ greatly in their cause and clinical course. For example, constipation due to absence or insufficiency in the secretion of intestinal juice includes the constipation occurring in diabetes and that of patients with copious and persistent vomiting.

We shall not consider here the forms of constipation which would naturally be studied in subsequent chapters, as, for example, that which results from a narrowing or compression of the intestine. We shall concern ourselves here only with habitual constipation which might be qualified as dyspeptic, and would come very appropriately in this place.

Constipation is common in various forms of dyspepsia. It fills an important position in the semeiology of most of the varieties of gastric dyspepsia. Germain Sée regards it as one of the most active causes of atonic dyspepsia, which is as often accompanied by flatulence. The gases accumulate behind the obstacle formed by the stagnating fæcal matters, and the distention then proceeds from below upward, from the large intestine to the small intestine and stomach. The affair is still more serious when hemorrhoids are present, which offer a greater or less obstacle to defecation. There is some truth in this rather too mechanical conception of flatulent dyspepsia. Constipation is always an aggravating condition in dyspepsia and we cannot hope to cure the latter unless we also relieve the former. The constipation is itself secondary; it is atonic and consecutive usually to a general neurotic condition, neurasthenia, hysteria, or arthritism.

In hyperchlorhydria we find another factor in the frequent vomiting, by means of which much fluid is removed from the intestinal tract, resulting in more or less

desiccation of the contents of the lower portions of the canal.

Constipation is therefore one of the most frequent occurrences in those belonging to the general family of neurotics. Among these we find simple neurotics; the arthritic, the gouty, and the obese; sufferers from diabetes in whom glycæmia exists as an additional factor; the neurasthenics with or without movable kidney; the hysterical, the epileptic, and the insane. We believe that chlorotic individuals, who so often suffer from constipation, belong equally to this neurotic family. Mental disturbances are also often the cause of true neurasthenic constipation.

Women suffer more often from this condition than men, a fact which is capable of explanation in several ways. They are more nervous, they have a wider pelvis, and finally, successive pregnancies often lead to a relaxation of the abdominal walls, an enteroptosis, which favors stagnation of the intestinal contents. The aged suffer from a functional atony of all their organs, and even a true atrophy of the coats of the bowel, and consequently are often constipated. The condition is sometimes so pronounced in them as to give rise to symptoms of actual intestinal obstruction.[1]

The predisposition to constipation is often increased by a faulty hygiene, such as the abuse of nitrogenous foods, want of exercise, and a habit of deferring visits to the closet. The latter cause is frequent with women and children. This faulty hygiene, aided sometimes by severe intellectual labor, tends to increase still more the pre-existing diathetic condition; it is a vicious circle.

Degrees and Clinical Forms.—Most atonic dyspeptics suffer after eating from a feeling of weight, redness of the face, somnolence, and distention of the abdomen. Defecation is difficult and often rendered more so by the presence of hemorrhoids. Sometimes these patients are constipated unknown to themselves; they go regularly to stool, but there is an insufficient evacuation. Others suffer from

[1] G. Thibierge: Thèse de Paris, 1884.

more obstinate constipation, never having a natural passage, and obtaining relief only by means of injections or purgative medicine.

We find often in these condition a general malaise, loss of appetite, headache, occasionally fever, a coated tongue, and gastric distress passing sometimes even into a typhoid state. With some patients, especially those of advanced age, the general condition deteriorates, the appetite is lost, there is even a disgust for food, and there may be vomiting, with abdominal pains radiating toward the lumbar regions and the thighs, in the parts supplied by the sciatic or the crural nerve. The question may then arise whether there is not a cancerous lesion, either of the stomach or of the intestine. It has even happened that scybala collecting in the course of the large intestine have been mistaken for malignant tumors.

Another type of constipated persons is the *constipé à gros ventre.* Patients of this class are more or less obese, have a prominent abdomen, a red face, and suffer from difficult respiration and from indigestion. Sometimes the abdomen becomes so distended as to excite the suspicion of an organic lesion, but the diagnosis is finally made clear by an enormous discharge from the bowels.

Complications.—The following are the most important: hemorrhoids, fissure of the anus, muco-membranous enteritis, auto-intoxication, intestinal obstruction, and ileus.

Auto-intoxication will be studied in the section on gastro-intestinal antisepsis, and obstruction and occlusion will be considered when we come to diseases of the intestine. The other complications will be noticed in the appropriate place in the following section.

Treatment.—Notwithstanding the self-evidence of the statement, we must repeat that the first thing to do is to suppress as far as may be the essential or occasional causes of constipation. Thus we must treat the neurotic condition in the neurasthenic, the glycæmia in the diabetic, and the plumbism in those suffering from lead colic. The most frequent occasional causes are those in the domain of hy-

giene, such as improper food, want of exercise, etc. We must always, then, make inquiries on these points, for they may often lead to the formulation of very important directions, more important even than the giving of medicine, since our aim ought always to be to bring about a cure if possible through the institution of hygienic measures. Physical remedies are always to be preferred to medicinal ones, since they are more nearly related to the hygienic.

We shall take up in their order, (*a*) the hygienic, (*b*) the mechanical, (*c*) the medicinal treatment, and (*d*) the treatment of complications.

(*a*) *Hygienic Treatment.*—Constipation is often caused and always increased by a diet which leaves but little residue, such as one of meat or nitrogenous food in general. In the normal condition it is the undigested residue of the food which, by stimulating the secretion and the contractile power of the intestine, prevents undue desiccation of its contents and favors their evacuation by increasing peristalsis. The diet which we are often obliged to prescribe for dyspeptics has, therefore, the disadvantage of favoring constipation.

Eggs act in the same way as meat, and as to milk the lay belief that it is laxative is erroneous. The truth of the matter is that people who are not accustomed to its use, and who take large quantities at once, frequently have at the beginning a temporary diarrhœa, but nine times out of ten that does not continue long, and constipation quickly supervenes. This offers occasionally a serious objection to a milk diet. When milk is taken in large quantities, colorless pasty matter, rich in fat, accumulates in the large intestine and is dislodged with difficulty. Injections of water have but little effect upon this fatty material and it would be better to use oil. Sometimes the accumulation of matter in the lower part of the rectum is so great as to prevent the injection of any liquid, and we have then to effect its removal by mechanical means, the finger, a spoon, or a spatula.

Water strongly impregnated with lime seems to favor

constipation. Impure water taken from rivers and other polluted sources often causes diarrhœa by reason of its richness in organic substances and micro-organisms; but this is not a therapeutic action of which we can avail ourselves, it is rather a pathogenic effect that we should avoid.

Too much intellectual work combined with insufficient exercise tends to provoke, maintain, and aggravate torpor of the intestine. People are sometimes careless about the time of going to the closet and thus acquire a bad habit of neglecting the calls of nature. They should be advised to go to stool regularly at the same hour every day, whether they feel an inclination to do so or not. There is an element of auto-suggestion in this practice the value of which is not to be despised. In matters of hygiene little things are not always the least good. It goes without saying that we should recommend those practices which are exactly the reverse of those which have a tendency to prevent a free action of the bowels.

In the matter of diet, we should advise the taking of food which furnishes a large residue in undigested material, provided always that this residue is not too great or of too coarse a nature, such as would irritate or even injure the mucous membrane of the intestinal tract. Vegetables and green fruits answer our purpose in this respect very well. In order to reduce to a minimum the injurious effect upon the stomach of a large amount of indigestible vegetable substances, it is often well to give only cooked fruit and vegetables in the form of purées. The vegetarian diet, described in a previous section, would be indicated in dyspepsia complicated by constipation, provided there is neither hypersecretion of hydrochloric acid nor marked stagnation of food in the stomach. We may mention here the employment of certain inert seeds, such as hulled linseed, white mustard, and psyllium plantago (fleawort). These may be given in doses of one to three teaspoonfuls in the morning before breakfast or once or twice a day at the beginning of a meal. A mucilaginous water having laxative properties may also be prepared from linseed or

psyllium by steeping one ounce of the seed in five or six ounces of cold or tepid water for about six hours and then straining.

Mechanical Treatment.—Under this one heading we include both the physical and the mechanical measures. They are gymnastics, massage, hydrotherapy, enemata, ascending douches, suppositories, and electricity.

Gymnastics.—By this term we mean not only gymnastics, as the word is generally understood, but also the performance of special exercises of the abdominal muscles. Bodily exercise is of great use in the case of those who lead sedentary lives, especially if they have a tendency to gout or obesity. The object of the special exercises is to give more strength to the walls of the abdomen; these exercises consist in principle of movements of the trunk, made while the patient is standing or recumbent, against a gradually increasing resisting force. Respiratory movements performed chiefly with the abdominal muscles are also useful.

Massage.[1]—The following is the method of abdominal massage recommended by Berne: First knead the integument and then the muscles of the abdomen, pressing gently with the palmar extremities of the fingers in the right iliac fossa; then execute a massage of the entire colon with the closed fists. This massage should be at once very gentle and very deep. Care must be taken to see that the patient has passed water before the massage is begun, and that there is no abdominal tumor nor a vesical calculus. Each séance should last from fifteen to twenty minutes. It will be well, we may add, to make pressure along the colon in the direction which its contents take from the cæcum to the rectum.

Occasionally use has been made of a method called "ball

[1] Dujardin-Beaumetz: "Hygiène Thérapeutique," p. 83, 1888. Soulier: "Traité de Thérapeutique," vol. ii., p. 768. Hirschberg: "Massage de l'Abdomen," Bulletin de Thérapeutique, p. 248, 1887. Berne: "Traitement de la Constipation par le Massage Abdominal," 1887.

massage." To execute it we employ a wooden ball covered with a piece of flannel, or, as Sahli [1] recommends, a cannon-ball from three to five pounds in weight. The patient lies on his back and rolls this ball himself over the abdomen. We have sometimes used this method with apparent benefit. Massage is an excellent remedy for constipation, and often succeeds where all other means have failed.

Hydrotherapy may be indirectly useful. Cold or hot douches used in the treatment of the neuropathic condition serve at the same time to overcome the constipation. Sometimes local douching of the abdomen is practised, but we do not recommend this very highly. Nevertheless we can bear witness to the good effects of moist applications, cold or hot compresses; large poultices act in the same way. Baths are useful, especially if combined with massage. The patient may himself, while in the bath, execute methodical *pétrissage* of the abdomen.

Injections.—These may act in a purely mechanical way, but we can increase their effect by adding purgatives or substances which, though not properly speaking purgatives, so irritate the mucous membrane of the rectum as to bring about more active contraction of the muscular coats of the colon and a more profuse glandular secretion.

We may use simple hot or cold water (the latter is the more active), or emollients, such as bran-water, infusion of marshmallow, decoction of linseed, psyllium, etc. Aqueous enemata act in proportion to their volume. For an adult we should use at least a pint of liquid. To render its laxative effect greater we may add sea-salt, honey, or *miel de mercuriale.*[2] The best and most active substance is glycerin. This may be simply mixed with the water in the proportion of from 1 to 3 tablespoonfuls to the pint. The action of glycerin may be increased by giving first 2 or 3 tablespoonfuls in 3 or 4 ounces of water; this injection is retained for twenty-five or thirty minutes, and then another large enema of tepid water is given. The glycerin

[1] Centralblatt für klinische Medicin, p. 280, 1888.

[2] A mixture of the fresh juice of mercurialis annua and honey.

provokes a more or less abundant secretion and thus prepares the inspissated contents of the bowel for the action of the evacuating enema.

Oil may take the place of glycerin. Two or three tablespoonfuls are emulsified by means of the yolk of an egg, and this is then given either in a large enema or in a small one in the same way as the glycerin. Recently large injections of oil have been recommended.[1] The patient resting on the back with the pelvis raised, about a pint of oil, heated to the temperature of the body, is slowly introduced, about twenty minutes or more being consumed in the process. To facilitate the penetration of the oil, the patient lies first on his left side, then on his right, so that the oil may flow into the large intestine through the force of gravity. It is rare that the initial injection reaches the cæcum, and we can seldom introduce more than from 3 to 8 ounces of oil at the first operation. The evacuation which follows this injection does not usually take place before the expiration of several hours, and several such enemata are needed in order to empty the large intestine completely. Very pure oil should be used, virgin olive oil being recommended by Fleiner.

We may add 6 or 8 drachms of sulphate of soda to the water used in an ordinary enema. This is hardly more active than a glycerin injection, but its efficiency is greatly increased by the addition to the soda of a decoction of senna.

Ascending douches are really only large injections given in a peculiar way; they are indicated especially in mucomembranous enteritis, and we shall describe them when treating of this condition.

Suppositories are sometimes useful when injections have failed. This is especally the case when there is impaction of the sigmoid flexure, and of the rectal ampulla, so as to prevent the passage of a sufficient quantity of liquid into the large intestine. The suppositories excite a more or less abundant secretion, which softens and lubricates these

[1] W. Fleiner: Berliner klinische Wochenschrift, 1893.

masses and effects their expulsion. Simple cocoa butter may be used, or when there is much pain or tenesmus, as is common in cases of hemorrhoids, we may add from $\frac{1}{6}$ to $\frac{1}{3}$ grain of belladonna. Glycerin suppositories are much more efficacious. These were made originally of hollow cones of cocoa butter filled with liquid glycerin, but lately a method has been found of solidifying the glycerin by incorporating it with gelose (a gelatinizing principle derived from agar-agar), and then moulding it into suppositories which are easy to use and very effectual. An operation usually occurs two or three hours after their introduction.

Electricity.—We may use any one of the three forms, static, faradic, or galvanic.

Static electricity is of special service in cases of neurasthenia.[1] The patient, resting on an insulated table, is brougth into communication with the negative pole of a static machine. It is usually sufficient to draw a series of sparks from the left iliac fossa in order to produce an evacuation in a short time.

The faradic current may be used externally or in the form of electrical injections. By the external application of currents of moderate intensity we effect electrization of the abdominal muscles which may be of advantage in cases of laxity of these tissues. Faradism may also be applied internally by means of one electrode introduced into the rectum and the other placed in contact with the skin of the epigastric or lumbar region. There is no fear of causing an ulceration of the intestinal mucous membrane by electrolytic action when this form of electricity is employed; nevertheless we think it is preferable to resort to continuous currents, which are so much more easily controllable.

In the application of galvanism the negative pole is introduced into the rectum, previously filled with water, so that the current may be diffused over a large surface; the

[1] Vigouroux: Appendice au "Traité de la Neurasthénie de Levillain."

electrode is inclosed in a rubber tube pierced with holes. The positive electrode, made of a broad cake of clay or a metal plate covered with moistened chamois, is placed on the epigastric or lumbar region. Currents of ten to fifteen milliampères are passed for a period of twenty minutes.

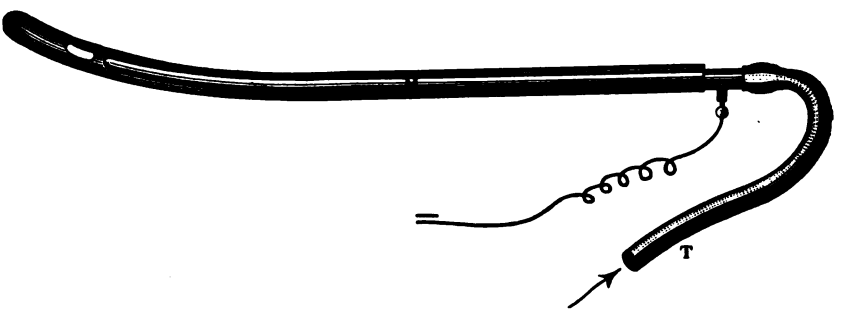


FIG. 8.—Electric Canula of Boudet, of Paris.

The currents should be interrupted from time to time, or they may be reversed.

Medical Treatment, Laxatives. — The first recommendation which we have to make is to employ drugs as seldom as possible in the treatment of constipation, and never until hygienic measures have proved ineffectual. Another principle to be borne in mind is never to resort to active purgatives for the relief of habitual constipation. The drastics should in a general way be proscribed, being reserved for the treatment of other cases in which a special indication may exist.

The saline purgatives have the special disadvantage that their action is always followed by constipation, which is obstinate in direct proportion to the degree of action produced by the drug. This fact is so well recognized that the salines are often employed in the treatment of diarrhœa. These salts, whether artificially prepared or existing naturally in mineral waters, should be used only in exceptional instances, as when no evacuation has taken place for several days and we desire to provoke one immediately without waiting for the slower action of other

remedies. This first movement may be facilitated by the simultaneous employment of injections or suppositories. When this preliminary clearing out has been effected we must rely upon the action of enemas, hygienic measures, or laxatives for a cure of the condition. As the patients quickly become habituated to the action of one remedy, we must change from time to time while following the general line of conduct which we are about to indicate. It is well to remember also that there are occasionally idiosyncrasies in respect to even the mild purgatives, the existence of which we can discover in individual cases only through experience. A certain drug may act well in one case and produce intolerable colic in another. We must therefore proceed with caution at the beginning of a course of treatment, feeling our way until we have learned what remedy is best suited to the particular case in hand.

Magnesia.—This drug has in a general way the advantage of being a mild laxative which is easy to take because of its almost complete absence of taste. It is particularly serviceable when alkalies are indicated, as it neutralizes four times as much acid as an equal weight of bicarbonate of soda. Its disadvantages are its insolubility and the readiness with which patients become habituated to its action. There are several kinds of magnesia in use, viz., calcined and heavy magnesia, hydrate of magnesia, and the hydrocarbonate or white magnesia. Calcined magnesia is especially useful when we desire to obtain an antacid as well as a laxative effect. Heavy magnesia, according to Patein, is inferior to the light form, of which it has neither the absorbent power nor the ready solubility in acids. On the other hand, it has the advantage of presenting a greater weight in less volume. Hydrate of magnesia is obtained by boiling calcined magnesia with twenty times its weight of water. Its action is milder than that of calcined magnesia, but it is seldom employed. White magnesia, which is often prescribed, is chemically a hydrocarbonate. It occurs in the form of a very light, white powder, almost insoluble in water. It dissolves in water acidulated with

carbonic acid gas, forming with the latter a bicarbonate. It is given in about double the dose of calcined magnesia, and is used by preference when a laxative rather than an antacid effect is desired.

Magnesia is often mixed with other substances, such as bicarbonate of soda, chalk, or subnitrate of bismuth, when the neutralization of acids is aimed at; salicylate of bismuth or naphthol when an antiseptic action is sought for; or with other laxatives, such as senna, sulphur, or cascara sagrada. Calcined magnesia produces a purgative effect in adults in doses of 2½ to 5 drachms; to obtain a laxative effect from ½ to 1 drachm will suffice. We may begin with a half-teaspoonful, increasing the dose at subsequent administrations, until the desired effect is obtained. To children under one year of age 4 or 5 grains may be given twice a day, and to older children from 8 to 30 grains, beginning with the smaller dose. The purgative action of magnesia, like that of almost all the laxatives which we are about to study, is rather slow; it will usually, therefore, be sufficient to give it with the meals or at bedtime in order to obtain an evacuation in the morning. This is an advantage, as the bowels are thereby made to move at the most desirable time for the formation of a healthy habit.

The French Codex contains, under the name of "white medicine," the following preparation:

℞ Calcined magnesia,	8	grammes.
White sugar,	50	"
Orange-flower water,	20	"
Water,	40	"

The water containing the magnesia is boiled, then the sugar and orange-flower water are added, and the mixture is strained. The orange-flower water may be replaced by any other flavoring substance.

The shops contain chocolate and magnesia lozenges composed of 3 grains of scammony and 1 drachm of calcined magnesia; the dose is 1 or 2 lozenges. There is also a preparation of granular magnesia containing one-quarter

its of weight of magnesia, which may be given in doses of 4 teaspoonfuls as a purgative and ½ to 1 teaspoonful as a laxative and antacid.

We often employ with benefit a powder prescribed by Germain Sée. It is composed of equal parts of calcined magnesia, cream of tartar, and precipitated sulphur. From 1 to 3 teaspoonfuls a day are taken in a little water at meal time. The insolubility of this powder is its only disadvantage. A little liquorice may be added, and we then obtain a powder which differs from that known as compound liquorice powder in that it contains no senna. The following is a formula of a compound liquorice powder, devised by Dujardin-Beaumetz, which is an excellent preparation:

℞ Alcoholic extract of senna (powdered),
Sublimed sulphur, . . . āā 6 grammes.
Powdered fennel,
Powdered aniseed, . . . āā 3 "
Pulverized cream of tartar,
Powdered liquorice, . . . āā 2 "
Powdered sugar, . . . 25 "

This is taken in the same dose as the preceding.

In cases of atonic dyspepsia, especially when there is flatulence, I occasionally add a small quantity of powdered ipecac to a laxative powder, similar to the preceding, as for example:

℞ Magnesia,
Precipitated sulphur,
Cream of tartar,
Powdered liquorice, . . . āā 20 grammes.
Powdered ipecac, . . . 0.3 "

Fluid magnesia of the French Codex contains 20 grammes of hydrocarbonate of magnesia in 650 grammes of water fully charged with carbonic acid, that is to say, containing 1 gramme in 32 of liquid.

Podophyllin.—This is what the English call vegetable calomel, because of its cholagogue action. It is a good laxative, especially when combined with belladonna. It

is best given in pills containing $\frac{1}{8}$ grain each of podophyllin and of extract of belladonna. From 1 to 3 pills are taken at bedtime, 1 the first day, 2 the next if no laxative effect has been produced, and, if necessary, 3 on the following day. Once an action has been obtained, we must return to 1 pill and recommence the series if need be.

Belladonna, which we have just mentioned in combination with podophyllin, is a laxative by itself. Trousseau recommended it very highly, giving it in gradually increasing doses of from $\frac{1}{6}$ to 1 grain. This remedy is especially indicated in cases in which there is severe colic associated with constipation.

Cascara sagrada.—This is an excellent laxative, which has the advantage of seldom producing colic, and which may be continued for a long time without any ill effects. The bark is given in powders of 4 grains each, one powder at bedtime or one morning and evening, if that does not suffice. In cases of atonic dyspepsia with diminished acidity, it will be useful to combine a little magnesia with the cascara, for we know that alkalies in small dose increase the secretion of hydrochloric acid. A fluid extract is sometimes employed instead of the powder of the bark.

Rhamnus frangula.—Buckthorn, which is not used in France, is said to be an excellent laxative, which never causes griping. It is employed in Germany in the form of a decoction of 20 to 30 grammes to the litre. The powdered bark may also be given in doses of 15 to 20 grains at bedtime.

Tamarind.—The pulp of the fruit of tamarindus indica is possessed of laxative properties; it is given in confection in doses of 5 to 12 drachms (in somewhat smaller dose if a laxative action only is desired), or in an infusion containing 5 drachms to the quart. It is found in the shops in the shape of a confection, which is a convenient form for administration. Occasionally, though not often, it produces colicky pains.

Rhubarb is purgative in doses of 15 to 60 grains, laxative in smaller doses. When given in small quantity it is

reputed to be a stomachic and is given at the beginning of a meal, alone or in combination with other powders such as cinchona or calumba. It would be better, however, to give it after eating in divided doses at intervals of half an hour.

One may also for the same purpose prescribe the wine of rhubarb, alone or with the addition of from 5 to 15 drops of tincture of ipecac, in cases of atonic dyspepsia with flatulence and constipation. Rhubarb would be an excellent laxative if it had not the disadvantage of frequently causing griping pains.

Manna.—This is a mild laxative much employed in the case of children. It may be given to them in doses of 5 to 10 drachms dissolved in water or milk; for adults larger doses up to 3 ounces are necessary. When it is desired to dissolve it in milk or water the liquid must be hot.

Senna.—This drug was formerly much more employed than it is at present, for it entered into the composition of a great number of purgative potions and enemata. It often gives rise to griping pains, but this effect is less frequently seen when an alcoholic extract is employed. All purgative teas have senna as their basis. The following is the formula of the purgative species (species laxantes) as given in the French Codex:

℞ Senna leaves, ... 2.0 grammes.
Elder flowers, ... 1.0 "
Green anise seed, ... 1.0 "
Fennel seed, ... 0.5 "
Bitartrate of potassium, . . 0.5 "
M. Sig. To make a cup of infusion.

The purgative draught of the Hospital Saint-Louis, often prescribed by Hardy, is said to be a good preparation. It is made by infusing 2 drachms each of senna and viola tricolor in a quart of boiling water; at the end of an hour the infusion is strained and sweetened with honey. The dose is a large glassful taken in the morning. Coffee disguises very well the taste of senna, so that the latter may be infused at the same time with the former, making a purgative coffee.

Scammony.—This is a drastic purgative which causes pretty severe griping pains. It enters in small porprotion, however, in the composition of a number of laxative preparations. The powder may be given alone in milk, the ordinary purgative dose being from 7 to 8 grains.

Aloes.—This forms the basis of a large number of laxative elixirs and pills. Its special advantage is that it acts in small dose and lends itself readily to administration in pill form. It is apt to induce a swelling of hemorrhoidal tumors, a property that is sometimes taken advantage of to bring back a bleeding in the piles when certain congestions of other parts seem to be due to the suppression of this flow. The drug also causes a congestion of the pelvic organs, and this fact offers a contra-indication to its employment when any inflammation of these organs exists, as, for example, when an old man is suffering from chronic prostatitis. The laxative dose is from 1 to 3 grains. The drug acts rather slowly, its effects being produced at the end of from ten to twenty hours. It is not apt to cause any severe griping pains. With larger doses, 6 to 12 grains, a marked purgative effect is obtained. Aloes is reputed to be a stomachic in small doses, hence its use is almost traditional in dyspepsia. It is administered usually in the form of pills, many of which have received special names. The *pilulæ ante cibum* contain each 2 grains of pulverized aloes and 1 grain of extract of cinchona; the dose is 1 or 2 pills at the beginning of a meal. *Anderson's pills* contain 2 grains each of aloes and gamboge; the latter is a drastic purge and the pills therefore are very active. Soap is a good vehicle for aloes. Fifteen grains each of aloes and medicinal soap may be mixed and made into ten pills. The following formula, devised by Lutz, is an excellent one and we can recommend it:

℞ Aloes,
Scammony,
Jalap, ... āā gr. xv.
Glycerin, ... ♏ viij.
Solution of caustic soda (29 per cent), ♏ xv.
M. et ft. pil. no. 20–25. Sig. One pill at bedtime.
12

We know of a number of individuals who have taken these pills for several years with great satisfaction and without experiencing any inconvenience from this long-continued use.

Castor oil, in teaspoonful or half-teaspoonful doses, is one of the best laxatives that we have. It may be taken for a long time without inconvenience, and does not produce secondary constipation. Its disagreeable taste may be masked by black coffee, orange juice, or black currant brandy. It may also be taken in capsules, a number of which are found in the market, which offer a very convenient mode of administration for those who can swallow them.

Special Clinical Forms of Constipation.—After having passed in review the different hygienic, mechanical, and medicinal measures which can be employed in combating this condition, we shall now indicate what special means are best adapted to the relief of the different forms met with clinically. We shall study constipation, (1) due to faulty hygiene, (2) in infants, (3) in cases of gastro-intestinal dyspepsia, (4) in cases of enteroptosis and obesity, and (5) in the aged.

Constipation Caused by Faulty Hygiene.—This is the form so frequently brought about by the abuse of nitrogenous food and the neglect of exercise, and it is by measures directed against these etiological factors that we must combat the condition. The patients must be made to eat more green vegetables and stewed fruits of various kinds, stewed apples and prunes. Rye bread is useful in some cases. We may also advise the employment of linseed or psyllium, which acts in the same way as those vegetable substances which leave a considerable undigested residue. In cases of this kind we may give salines or aloes in moderate doses and cautiously. Physical exercise in the open air and gymnastics will naturally be among the means resorted to to overcome the constipation due to a neglect of these measures.

When all these fail we must have recourse to enemas

and mild laxatives, such as cascara sagrada, magnesia, tamarind, rhamnus, or Lutz's pills above mentioned. The medicinal treatment should be employed only as long as is absolutely necessary and must be replaced as soon as possible by hygienic measures. In very obstinate cases, especially among the neurotic, massage and electricity will be useful as aids to the action of laxatives. Castor oil is here particularly to be recommended. Saline purgatives should be employed only temporarily when there are signs of acute indigestion or auto-intoxication, with the object of obtaining a sort of antisepsis by a thorough sweeping out of the intestinal tract.

Constipation in Children.—Young children naturally never think of going to stool unless they are compelled to do so, and as the desire gradually grows less they become constipated. Nurses have some simple remedies for reawakening this blunted reflex. One of these is to introduce into the anus any solid body, such as a little stem of parsley or chervil, which usually speedily causes a movement. Sometimes it will be necessary to employ small injections of pure water, glycerin, or oil emulsion.

The disorder is quite common also in older children, especially those living in the city, and sometimes becomes so inveterate as to lead to attacks of muco-membranous enteritis with pseudo-diarrhœic discharges. It is this diarrhœa that the family and even the physician at times fear and attack, when in reality they should turn their attention rather to the underlying constipation. It is well, therefore, to be on our guard when we discover mucus in the stools of children. The treatment consists in the use of manna, magnesia, or castor oil in small doses. Of course we must not neglect hygienic measures. In cases of intercurrent diarrhœa, with or without the appearance of mucus in the stools, we may advantageously give calomel in doses of 1½ to 3 grains in honey. The calomel should be repeated only at rather long intervals, and great caution should be observed in its use.

Gastro-Intestinal Dyspepsia.—Constipation is fre-

quent in the various forms of dyspepsia. The therapeutic indications are, in a general fashion, the same as those which we have indicated in the section on the results of a faulty hygiene, yet there are some special points to be considered. In cases of hypersecretion of hydrochloric acid, we must reduce to a minimum the irritation of the stomach, hence aloes, scammony, and senna are hardly suitable. Neither can we permit these patients to eat a large quantity of green vegetables because of the gastric stagnation which exists or tends to exist, and also because this alimentary residue helps to increase still more the secretion of acid. Patients with dilatation with permanent stasis ought not, for the same reason, to take green vegetables or inert seeds such as psyllium. Magnesia in rather large dose does good service in cases of this nature; in small doses it is more suitable for patients with diminished acidity, since alkalies in small quantities stimulate the secretion of hydrochloric acid. Hayem holds that the long-continued use of sulphate of soda reduces or even suppresses altogether the production of hydrochloric acid; another reason why the use of purgative waters, especially in the case of dyspeptics, should not be abused.

Enteroptosis and Obesity.—Glénard recommends the purgative saline waters in cases of enteroptosis, for in these patients a condition of more or less marked abdominal plethora, such as is found in the obese, is often present. Mineral water cures are much in vogue at Brides in Savoy, and at Tarasp-Schuls, Marienbad, Carlsbad, and Elster in Germany.[1]

Constipation in Old People.—The aged are very sub-

[1] Brides water contains per litre 9.30 grammes of magnesia, 5.06 of sulphate of soda, and 0.83 of chloride of magnesium. It is laxative in doses of one glass, and purgative in doses of three or four glasses.

Châtel-Guyon water, which may be used in similar cases, owes its laxative properties to chloride of magnesium (1.22 grammes per litre) and to bicarbonate of magnesium (0.42 per litre). Four or five glasses a day are needed to produce a laxative effect, and it is

ject to this trouble. It is in them, especially in women, that we so often find collections of scybalous masses in the colon. In consequence of the atrophy of the muscular coats of the intestine the condition may end in actual obstruction (Thibierge). We shall refer to this in another place. When hygienic measures alone are insufficient we must prescribe injections, suppositories, castor oil in small doses, and occasionally saline purgatives.

Complications.—Constipation due to intestinal atony, which we have had especially in view, may be accompanied by complications of various kinds. The presence of more or less indurated masses of fæces, and the mechanical obstacle which they offer to the passage of the contents of the bowel, may induce further atony and gastro-intestinal flatulence. There is little danger of auto-intoxication when the fæcal matters are hard, as there is then little absorption of toxic substances. But attacks of diarrhœa of inflammatory origin not infrequently succeed the constipation, and we then see symptoms of acute indigestion, due no doubt to auto-intoxication. There are certain other complications arising from mechanical causes; the indurated matters provoke by their presence a superficial inflammation of the mucous membrane, and we get symptoms of chronic colitis and of muco-membranous enteritis. The fæcal masses have a tendency to accumulate especially in the cæcum and sigmoid flexure, and the accidents which they cause vary according to the anatomical conformation

therefore not suited to cases in which there is dilatation of the stomach.

In the waters of Marienbad, a spa particularly recommended for the cure of obesity, we find 5 grammes of sulphate of soda and 0.66 of sulphate of magnesia per litre. One litre contains nearly 10 grammes of mineral substances.

Carlsbad water contains 2.40 grammes of sulphate of soda, 0.186 of sulphate of potassa, and 0.16 of carbonate of magnesia. The dose is two or three glasses a day (300 to 450 grammes).

We should remark that these waters are used rather for the cure of obesity than for that of constipation in the obese.

and the physiological action of these segments of the intestine. Recent researches, and more particularly laparatomies on the living subject, have shown the rarity of typhlitis from stercoral engorgement of the cæcum and the frequency of ulcerative appendicitis; it has even been doubted whether such a thing as typhlitis from cæcal impaction exists. Nevertheless appendicitis is an accident occurring almost exclusively in sufferers from habitual constipation, and the most frequent cause of inflammation of the vermiform appendix is the presence of a little mass of fæcal matter entering from the cæcum.

The accumulation of scybala in the sigmoid flexure leads to dilatation; this sometimes gives rise to an insurmountable obstacle and to intestinal obstruction. It happens occasionally that the sigmoid flexure thus distended by fæcal matter falls forward, turning on its axis, and so produces an occlusion by torsion.

The repeated straining at stool necessitated by the fact of constipation, the hindrance to the venous circulation of the intestine, and the inflammatory irritation caused by the contact and more or less violent passage of hardened fæces are causes which lead to the production of hemorrhoids, and then the latter, forming part of a vicious circle, increase the constipation by offering an obstacle to the evacuation of the rectum. Finally, the passage of these large indurated masses causes not infrequently erosions and painful fissures of the anus; the latter often coexist with hemorrhoids. Of these complications, intestinal obstruction and occlusion will be studied in a special chapter, as will also typhlitis and appendicitis. The treatment of auto-intoxication and acute indigestion will be given in the chapter on intestinal antisepsis. Fissure of the anus calls for surgical treatment. We have then in this place to concern ourselves only with muco-membranous enteritis and the medical treatment of hemorrhoids.

Muco-membranous enteritis is an affection which has been recognized for a considerable period but is even yet insufficiently studied; it is the glutinous diarrhœa of Van

Swieten.[1] In the older writings (Morgagni, Fernel), observations are made of cases which were evidently muco-membranous enteritis. More recently attention has been specially drawn to the affection by articles and works of numerous writers, French, English, and American.[2]

The most complete clinical history of the disease that we possess is found in the work on "Gastro-Intestinal Dyspepsia," by Germain Sée (1883, p. 223). At the beginning and in very mild cases, the affection is characterized simply by the appearance in the stools of sufferers from constipation of transparent glairy mucus, coming in greatest abundance with the last portion of the evacuation. In other cases the mucus collects in little masses looking like frog's spawn or pieces of soft-boiled white of egg. Sometimes there is a whitish coating evenly spread over the surface of the fæces, or there may here and there be irregular whitish or membranous fragments. These may simulate tape-worm, and this error has not infrequently been made, not only by the patients, but also by physicians. More rarely there are little tubular pieces, which are sometimes mistaken for sphacelated and detached fragments of the mucous membrane or for pieces of croupous pseudo-membrane.

This is the form which muco-membranous enteritis takes outside of the acute attacks which we shall describe presently. Microscopical examination has shown the presence in these glutinous or membranous matters of mucus, epithelial débris, an enormous quantity of microbes, especially of the bacillus coli, but very little fibrinous albuminoid

[1] Glutinous diarrhœa (Van Swieten) ; glairy enteritis (Nonat) : tubular diarrhœa (Good) ; mucous affection of the intestine (Whitehead) ; membranous enteritis (Da Costa) ; membranous affection of the intestine (Gross) ; painful affection of the intestine (Powell) ; intestinal croup (Clemens) ; herpédite exfoliatrice (Gigot-Suard) ; mucous colic (Nothnagel) ; fibrinous diarrhœa (Granthaus) ; interstitial enteritis (Wanebroucq).—G. Lyon, Gazette des Hôpitaux, p. 493, 1889.

[2] A bibliography will be found in the "Medical and Surgical History of the War of the Rebellion" (United States).

material. It is, therefore, a superficial catarrhal inflammation of the large intestine, unassociated with any deep lesion, at least in recent cases. It is probable that the desiccation of the mucous secretion by resorption of its water gives to it a glutinous and then a membranous aspect. However, there may be a more deeply seated inflammation, which may even lead to ulceration, becoming then an interstitial enteritis. Wanebroucq has seen cases of this kind, but the name interstitial enteritis certainly applies only to a small number of severe and inveterate cases of muco-membranous colitis.

It is probable that muco-membranous enteritis is not a morbid entity, but that it may depend upon various etiological factors. However this may be, it occurs frequently as a complication of constipation, and that is what concerns us here. Patients with this affection often suffer from very intense colicky pains in the region of the colon. These pains frequently assume the form of true crises, enteralgia, which have occasionally been mistaken for hepatic colic. There may be acute attacks which modify greatly the aspect of the disease, coming on after a prolonged period of constipation. These dysenteriform crises, which have been well described by Lasègue, have not infrequently been taken for sporadic dysentery; there are frequent painful evacuations, tenesmus, bloody discharges, in fact nothing is wanting to make the resemblance complete. Between these severe dysenteriform crises and constipation with mucous discharges, there are many intermediate forms; in children especially the attacks of diarrhœa following constipation are quite frequently accompanied by slight tenesmus, and the expulsion of a little bloody mucus.

Occasionally accompanying these severe intestinal pains and the diarrhœa, there is an elevation of temperature which may arouse a suspicion of typhoid fever. This is the result of the breaking up of matters rich in toxic substances and in which bacteria swarm; we are unable to say whether there is simply a poisoning of the system by absorption of chemical substances or whether there is an

actual penetration of bacilli, of the bacillus coli perhaps, through the eroded mucous membrane, but there can be no doubt of the infectious nature of these phenomena and of their origin in the colon.

In the milder forms when there is simply the presence of a small quantity of mucus, the treatment is that of the constipation. We must not forget that there may be at the same time hypersecretion of hydrochloric acid, movable kidney, or neurasthenia, and that the treatment must therefore be directed against these affections, if they exist, as well as against the constipation. The best laxative in these conditions is castor oil given in small doses every morning. Injections are also useful. Muco-membranous enteritis is often treated, at Plombières especially, by ascending douches, and the results obtained are excellent in many cases. However, as Malibran[1] very justly remarks, they must not be administered during acute attacks. This writer combines ascending douches with enemata given at bedtime and retained during the night and with abdominal massage, especially when there are hard masses of fæces in the intestine. Frequently the bowel does not rid itself of these retained scybala until the ascending douches have been administered daily for some time. In cases of moderate severity much good sometimes follows a course of purgative mineral waters, but we must be sure that the condition of the stomach is not such as to offer a contra-indication to this form of treatment. When the pain is very severe we must resort to hot applications, hot baths, or belladonna; opium and morphine have the disadvantage of increasing the constipation.

In cases of profuse diarrhœic discharges with typhoid symptoms, it will be well to give a purge. To this end we may employ any of the salines or purgative mineral waters, but, in children especially, the remedy to be preferred is calomel, which possesses antiseptic properties.

Lavage of the intestine may be accomplished by means of enteroclysis. For this purpose all that is necessary is

[1] "L'Atonie Intestinale et ses Complications."

to attach a rubber tube to a reservoir or a simple funnel, the lower extremity of the tube being provided with a soft rubber catheter or œsophageal sound. The bowel may then be washed out with boiled or naphtholated water. In

FIG. 4.—Galante's Apparatus for Enteroclysis.

order to insure deep penetration of the liquid, Le Gendre advises that the injection be made with the patient lying on his back with the hips slightly elevated; after as great a quantity of water as possible has been injected the patient turns over on his right side, and then it will be found that a still larger amount can be passed into the intestine.

This is because the change of position allows the fluid to pass around the left angle of the colon and enter the transverse portion.

Revilliod has recently proposed the following plan of treatment for muco-membranous enteritis. He first orders a very large enema to be given in the way Le Gendre advises, adding to it some castor oil or ipecac in order to obtain a thorough clearing out of the intestine. If necessary, a second injection of borated water may be given. After that he administers an injection of 2½ drachms each of subnitrate and of salicylate of bismuth in 1 pint of mucilage of quince seed; this is to be retained, if possible, for twenty-four hours, the patient remaining in bed. If this entire amount cannot be retained a smaller quantity is given. It has been found that the bismuth in this mixture is not entirely expelled until after several days. This mode of treatment is said to have sometimes cured muco-membranous enteritis, and good results are said to have been obtained by it in dysentery and in all cases in which an ulceration of the large intestine exists.[1]

Benzo-naphthol is indicated whenever intestinal antisepsis is desired; it is given in 7-grain doses to the amount of about a drachm a day.

In the treatment of membranous enteritis the patient should be placed in the most favorable hygienic conditions possible, and he should avoid exposure to cold, especially to chilling of the abdomen. Care should be taken not to overload the stomach or to irritate it with rich or spicy food.

Hemorrhoids.—This trouble is a frequent complication of constipation, and it would seem that the constitution which predisposes to the one condition predisposes also to the other. Some writers look upon active congestion of the rectal veins as the principal cause of piles, while others regard the affection as due to a mechanical stasis which is favored by the anatomical disposition of the hemorrhoidal

[1] Revue Médicale de la Suisse Romande, and Bulletin Médical, Jan. 29th, 1893.

veins and also by the efforts at defecation to which these patients are forced. It is probable that all these elements enter into the pathogenesis of rectal varices. Quénu thinks that the elasticity of the veins is previously compromised by a chronic phlebitis; this phlebitis would explain the persistence of the venous dilatations as soon as they have attained a certain degree and have lasted for a certain time.

Hemorrhoids are internal or external according as they are developed above or below the anal sphincter; the external are alone visible on ordinary inspection. They may be more or less voluminous and are, like the internal ones, subject to acute congestive attacks; they are then turgid and bluish in color. When they have existed for some time they become thickened, withered, and look as if covered with skin, assuming, in a word, the appearance of the *ficus* of the older writers.

Internal hemorrhoids are appreciable only to the touch, except at such times as they are extruded through the anal sphincter. The latter occurs when they are swollen and pushed out by descending fæcal masses. They may then become strangulated and can be reduced only with great difficulty. Sometimes they become the seat of a more or less abundant hemorrhage, which takes place usually after a movement. The irritated rectal mucous membrane often exudes a leucorrhœic discharge. There may also be produced ulcerations and very painful fissures.

The symptoms consist in mild cases of a feeling of weight at the anus, increased difficulty in defecation, and tenesmus; in more severe cases there is acute pain with strangulation and ulceration of the mucous membrane. When the tumors become strangulated they may ulcerate, become inflamed and the seat of abscesses, and the phlebitis may cause secondarily abscess of the liver, pyæmia, etc. The hemorrhages may be so frequent and abundant as to cause anæmia and debility.

Medical treatment usually suffices when the condition is not very marked, when the congestion is slight and hemorrhage is not profuse, and when, in the case of extruded

internal piles, reduction is easy; when these conditions are reversed, when serious inflammation threatens, and when the loss of blood is considerable, we must resort to surgical measures. We are concerned here with the medical treatment only.

We must, before all else, overcome the constipation, which, if it is not the primary cause, tends at least to exaggerate the trouble. We should avoid the use of aloes and of the drastic purgatives which cause congestion of the pelvic organs. In the case of moderate tenesmus and not very abundant hemorrhage we may give small injections of cold water several times a day. It is a good plan to give a cold enema after each movement. If the turgescence is more marked and the tumor is reducible with difficulty, applications of very hot water, made by means of compresses or of a small sponge, may be of service. Sometimes good results follow the direction of steam from the nozzle of a kettle against the tumors. We may also give hot baths, in a tub in preference to sitz baths, or use sprays of borated or carbolated water. Hot applications are much preferable to cold ones, although the latter are often recommended. Nélaton advised sufferers from this condition to go to the closet in the evening rather than in the morning, as the recumbent position favors the reduction of the hemorrhoidal tumors.

When there is prolapse and the tumors are irreducible by ordinary means we may proceed in the following way: The patient lying on the side, the operator introduces the index finger of the left hand, smeared with borated or iodoform-vaselin, the entire region having been previously washed with boiled or hot borated water; then with the right hand taxis is made, the tumors being slidden along the index finger which serves as a guide. It has been advised, in cases in which these measures fail, to apply leeches or to prick the hemorrhoids with a lancet; but these are dangerous procedures and may cause inflammation and phlebitis. Leech bites where antisepsis is impossible are particularly dangerous. It would be much

better to resort at once to surgical methods, especially to forcible dilatation of the anus.

Certain drugs have the reputation of reducing the hemorrhoidal congestion; among these are hamamelis, capsicum, and ergot, but the latter ought not, in our opinion, to be used. Capsicum annuum (red pepper) is given in pill form in doses of from 12 to 30 grains a day, or in aqueous extract in doses of from 4 to 6 grains morning and evening. Hamamelis virginica (witch hazel), which is at least harmless, is said by some to cure all forms of varices including hemorrhoids. It may be given in tincture in doses of 5 to 10 drops three times a day. In America the most commonly employed form is the fluid extract given in doses of 1 to 2 drachms. A solid extract, improperly called hamamelin, is used in doses of 1 grain in pill form (Soulier). Milfoil and ranunculus ficaria (pilewort) have also been recommended.

Hemorrhage is treated by cold injections and the application of ice, or by tampons of iodoform gauze or cotton. Care must be taken to see that the blood does not escape into the rectum without appearing externally.[1] Exceptionally the hemorrhage is very profuse. In a case of this kind Landowski succeeded in arresting the hemorrhage[2] by plunging the patient into a bath with a temperature of 95°, raised to 113° F., the anus being held open by a speculum.

The pain may be relieved by suppositories of belladonna, opium, morphine, or hyoscyamus, to which astringents, such as tannin or rhatany, or antiseptics, such as iodoform, salol, or antipyrin, may be added. Reclus recommends very highly the application of hot water (113° to 122° F.) and the introduction into the anus of little pledgets of absorbent cotton wet with a solution of cocaine (1:50). This is especially useful when the hemorrhoids are swollen and painful. When the pain is very severe and tenesmus, due to erosions or fissures, is intense, for-

[1] Ozenne: "Hémorrhoïdes," Bibliothèque Charcot-Debove.

[2] Landowski: Revue de Chirurgie, p. 500, 1881.

cible dilatation of the sphincter will be the best remedy. It does not cure the disease, but it gives great relief.

In cases of leucorrhœic discharge and of superficial inflammation of the skin or mucous membrane of the anal orifice, astringent ointments are useful; such are tannin, 15 to 30 grains to the ounce of vaselin, glycerole of tannin, oxide of zinc ointment (1:10), etc. Brinley applies calomel to inflamed or bleeding piles; Reissmann[1] touches them with a solution of iodine in glycerin. He first uses a weak solution (iodine, 3 grains, iodide of potassium, 30 grains, and glycerin, 1 ounce), and then a stronger one (iodine, 15 grains, iodide of potassium, 1 drachm, and glycerin, 1 ounce). In response to these applications it is said that the hemorrhoids rapidly diminish in volume, the ulcers heal, and a cure of even the most severe cases is obtained within two or three weeks. But we may be permitted to question the certainty of these results.

[1] Wiener medizinische Presse, No. 12, 1892. Quoted by Ozenne.

CHAPTER VIII.

DIARRHŒA.

We shall not attempt to present a complete description of diarrhœa in this chapter, but shall limit ourselves to a consideration of the therapeutical indications present in this condition. What we shall have to say, however, of the principles of treatment of diarrhœa as a symptom will find its application when we come to speak of the special forms in subsequent chapters.

Definition.—Diarrhœa consists essentially in the elimination by the intestine of a quantity of water much greater than normal. This water comes from the small intestine. When there is a discharge of fluid exuded from the walls of the large we have to do with a false diarrhœa, as in certain forms of muco-membranous colitis and in dysentery. The fluid may be what is taken in by the mouth, being eliminated in consequence of an excessive peristaltic action of the stomach and intestine, or it may be the result of an exaggerated secretion from the digestive tube or its adnexa. The water thus passed out may carry with it a very complex mixture of substances of diverse nature and origin. The predominance of one of these substances, the bile for example, may give to the diarrhœa a special character; it is thus that certain semeiological varieties are distinguished. We will pass rapidly in review the principal etiological and pathogenic factors, for though we shall not dwell long on this point, it is impossible to make a general study of the treatment if we have not a sufficient idea of the causes and mechanism of this pathological phenomenon.

Etiology.—Speaking broadly there are four main causes of the disease, viz.: 1, external forces of a physical or me-

chanical order, such as traumatism, heat, cold, etc.; 2, infection; 3, intoxications; 4, the mode of vital reaction peculiar to the special category of living beings, and above all the morbid excitability of the nervous system (arthritism, the neurotic condition). . Frequently several of these forces combine their action in such a way that, in any particular case, the etiological elements are seen to be very complex; and in all cases we have to take into account the special mode of reaction of the individual in the presence of any particular morbid cause.

We must learn to recognize the nature of these causes and the importance of their rôle in each individual case, and also how best to combat if not entirely to suppress them. It is a truism that we must suppress the cause of the disease, but it is fully as important, from a point of view of therapeutics, to discover what the mechanism of diarrhœa is. And this leads us up to a much-debated question, viz., what is the mechanism of purgation? Some believe that there is an exaggerated secretion of the intestinal fluids, while others hold that the increased peristaltic action of the bowel hurries along the entire contents, secretions, ingested fluids, etc., allowing no time for absorption or for the gradual desiccation of the fæces. This would be a very simple mechanism. The partisans of the theory of increased secretion explain it in different ways: some hold that there is an actual catarrhal inflammation of the mucous membrane, others that there is a congestion of the vessels through vaso-motor reflex, while others still look upon it as a simple exosmosis. It is possible that there is more or less truth in all these explanations, and the question is to determine the predominating factor in the particular case under observation. There appears often to be a hypersecretion joined with augmented peristalsis. Excessive movement, vaso-motor disturbance, these are the two fundamental elements. It is probable that the first finds expression in the colicky pains, and these pains therefore offer an important indication for treatment. They are to be overcome by sedatives, by opium especially.

Let us see how these general causes act in producing diarrhœa, and what the mechanism is by which they provoke it; that will furnish us with the indications for treatment. Among the physical causes cold is the most important; it acts in a reflex way by stimulating either the movement of the intestine or its secretion. It acts the more readily as the personal susceptibility is greater, as its effects are most marked in the neurotic and those of the rheumatic diathesis whom Landouz so justly calls the neuro-arthritic. Certain persons also have a special predisposition to diarrhœa, having, as it were, a sensitive intestine, and in them diarrhœa follows any exposure to cold and even results from any unusual mental emotion. We must take this personal equation into account.

In the section on purgatives we have said all that is necessary concerning the toxic causes of diarrhœa, and we will only add here that, in addition to the toxic matters of infectious origin, there are also purgative substances furnished by the organism itself. The bile, for example, has been called a physiological laxative, and any hypersecretion of this fluid is almost of necessity accompanied by diarrhœa. Looseness of the bowels is also not uncommon in uræmia and is due apparently to an elimination by the intestine of auto-toxic substances; it is therefore a condition which ought not to be thoughtlessly arrested.

The mechanism by which infection produces a diarrhœa is certainly very complex. In this condition we have to distinguish two great classes of phenomena: 1. The infectious agent remains localized in the intestine, and causes irritation and inflammation either directly or by the toxic products which result from its presence; 2. The infectious agent itself penetrates into the organism and gives rise to a general infection, such as we see in typhoid fever.

In the first case the toxic substances produced by the infectious agent or under its influence may act almost exclusively upon the intestine, or else, if they have been absorbed and have escaped the destructive action of the liver, they occasion general symptoms of a purely toxic nature.

These are the cases which we designate as acute indigestion. The indication in these conditions is to favor the elimination by the rectum of the poison remaining in the intestine, to destroy the zymotic agent which has elaborated it, and to bring about the expulsion through the kidneys of that which has already been absorbed into the system. This will suffice to effect a cure provided that there is not too severe a degree of inflammation of the intestine present.

The same indications are present in the second case, but here another element comes in. The pathogenic bacteria continue their evolution in the organism, and it is upon their presence that the course and duration of the disease especially depend; the intestinal phenomena pass into the second rank of importance. Typhoid fever is a good example of diseases of this class.

In any case of infectious diarrhœa we must aim to secure the elimination and destruction of the morbific agent; its destruction, or at least the reduction of its injurious effects to a minimum, is precisely the object of intestinal antisepsis, to the study of which we shall devote a special chapter. It is for this reason that we so often combine antiseptics with the other remedies directed solely to a slowing of peristalsis or a drying up of the secretions of the bowel.

The neuropathic element may of itself produce diarrhœa, usually transitory, such as we see often as a result of strong emotions or great fear. This nervous diarrhœa may also be persistent, as when it occurs in patients suffering from some lesion of the spinal cord, tabes for example, or from Basedow's disease, neurasthenia, hysteria, etc. The general neuropathic element often enters also into the causation of other varieties of diarrhœa.

We have hitherto considered only the physiological and pathogenic element, but we must not forget that there may also be added an anatomical element, that acute or chronic enteritis may arise according as the causes are more or less persistent. The enteritis becomes then itself a cause of the diarrhœa, and after overcoming the original cause

we shall still have to fight against the lesion of the intestine remaining.

But this is not all, and in order to attain success in our fight against the disease we must be familiar with the injurious consequences that it may entail upon the organism. By reason of a persistent and copious diarrhœa the food is rushed through the alimentary canal without being digested, and there results a true state of inanition which can only be averted by an appropriate diet. When the flux is very abundant the elimination of large quantities of water may be a danger, giving rise to choleraic phenomena, such as anuria, weak pulse, reduction of body temperature, and cyanosis. There may also be an element of auto-intoxication joined to this mechanical one, yet we should not lose from view the fact of this elimination of fluids and should do what lies in our power to supply the loss.

Passing now to the remedial agents at our disposal for the treatment of diarrhœa, we shall study successively: 1, diet; 2, medicines acting especially in the way of a reduction of peristalsis; 3, drugs which diminish intestinal secretion; 4, intestinal antisepsis; and, 5, measures adapted to overcome the injurious effects of the excessive loss of fluids.

1. *Diet.*—The general indication here is to reduce the mass of food in the intestine, and especially to remove as far as possible from the diet all those substances which leave a large indigestible residue to act as an irritant to the intestinal mucous membrane. We must prescribe a diet that contains a large amount of nourishment in small compass, and this excludes green vegetables at once. We should advise the taking of those articles which possess astringent properties and proscribe those which are laxative in their action. In regard to these points there are often individual idiosyncrasies which we must inquire into and respect when learned. Finally, we must endeavor to prevent, as far as we can by means of appropriate food, intestinal fermentation and the further elaboration of toxines by the food undergoing digestion.

When the diarrhœa is temporary and results from an acute indigestion, the indications are best fulfilled by restricting the diet, allowing, for example, only eggs, milk, soups, very little meat, and little in the way of drink. In all cases, of whatever nature, it is necessary to forbid highly seasoned food and strong cheese, which would carry into the intestine already formed toxic substances and predispose to subsequent fermentation. Articles of diet which leave an abundant residue also favor the occurrence of fermentation. This is a subject closely related to intestinal antisepsis, of which we shall speak later.

As a general rule only a limited amount of fluids should be permitted, but this is a rule not without important exceptions. The diminution in the quantity of water ingested is of no particular moment in cases of merely temporary diarrhœa. When the flux is excessive, as in choleriform diarrhœa, the thirst from which the patient suffers is sometimes intense. It will occasionally be useful to enforce an entire abstinence from food and to permit only a little pure water or lactic acid lemonade. This is the best way of preventing intestinal fermentation by withdrawing everything that may serve as a basis for this process. If the water or the lemonade is not retained and there is a tendency to collapse from excessive dehydration, we may have to replace artificially the fluid withdrawn from the circulation; we shall return to this subject later.

Milk may render great service in the treatment of many forms of diarrhœa. It is a complete aliment, liquid in form, and little liable to putrescent decomposition. We may, according to circumstances, prescribe a partial or an absolute milk diet, and sterilized milk often, especially in infants, gives better results than the natural fluid.

Eggs are frequently employed, and rightly, for they afford a large amount of nourishment in small volume. Albuminous water may also be given as a beverage; its beneficial action, while not thoroughly understood, is nevertheless very real.

Raw meat is of service in chronic diarrhœa, especially

in children. In its preparation, whether by mincing, scraping, or pounding, we remove all the indigestible portions. It may be taken in bouillon, with tapioca, or with jam; children take it readily when mixed with jam. Meat powder, with prepared chalk or bismuth, may also be used with advantage, especially in cases of phthisis.

Among the astringent alimentary substances we may mention rice, quinces, and starch, which may be given in the form of decoction or by enema. Quinces enjoy a special reputation in this respect; we may prepare a decoction of the seeds (½ to 1 ounce in 2 pints of water), the good effects of which are due perhaps as much to the mucilage as to the tannin which it contains, or a syrup which may be given in doses of 1½ to 3 ounces alone or employed to sweeten other more or less complex mixtures. The starch is given in decoction either by the mouth (3 to 5 teaspoonfuls to the quart of water) or by enema (3 to 5 teaspoonsfuls to the pint).

Peristaltic Sedatives.—These remedies are at the same time calmatives of pain, for the colic seems to be in effect the outward expression of exaggerated contractions of the intestine, especially of the colon; the pains of inflammatory origin are alleviated by the same means. In the first rank we would place hygienic treatment. We must protect the patients, especially if they are nervous or of the rheumatic temperament, from the action of cold; they ought to be warmly clad and wear woollen or flannel garments, and especially should they wear flannel over the abdomen, for chilling of this region more than that of the general surface is a special cause of colic and diarrhœa.

Opium and morphine are *par excellence* sedatives to the peristaltic movements of the intestine. Opium may be employed in the form of powder, extract, laudanum, black drop, or paregoric; it enters into the composition of numerous formulæ. One of the oldest of these and which is still in vogue is diascordium. This is really a combination of opium and of numerous astringent substances, the complex formula of which has been somewhat simplified. One

gramme of this electuary corresponds to six milligrammes of extract of opium. Diascordium is given to the amount of 4 to 8 grammes in half-gramme doses, either alone or combined with an equal quantity of subnitrate of bismuth. Bouchardat proposes the following formula as a substitute for diascordium:

℞ Hydrochlorate of morphine,	.	0.03 gramme.
Tannin,	.	0.50 "
Confection of rose,	.	6.00 grammes.
Phosphate of calcium,	.	3.00 "
Tincture of balsam of tolu,	.	10.00 "

M. Sig. One gramme of this mixture corresponds to 2 milligrammes of morphine.

Hydrochlorate of morphine may be used instead of opium, especially when it is impossible to give opium by the mouth, or when the pains are especially severe, as for example, when intestinal ulceration is present.

The opiates are sometimes replaced by other sedative preparations, the good effects of which have been vaunted in diarrhœa. Indian hemp in doses of 10 to 30 drops of the tincture has been given for the relief of tropical diarrhœa. Chlorodyne has also been employed for the same purpose. This is an English preparation, the formula for which is unknown.[1]

3. *Treatment of Hypersecretion.*—Two kinds of remedies will find mention under this rubric, viz., inert powders and astringents.

Certain powders appear to act as mechanical obstruants, at least we can explain their action only in this way, as their chemical effect is nil. It seems not improbable that these powders, collecting in considerable quantity in the large intestine, act as a sort of plug, which arrests or retards the evacuation of the contents of the bowel. It is said also that their presence in a thin layer over the surface of the intestine, especially an ulcerated surface, serves as a sort of protective against irritants. But whatever

[1] De Santi: De l'Entertie chronique Paludéenne ou Diarrhée de Cochinchine.

the explanation may be, the value of inert powders is beyond question. Among these powders we shall consider subnitrate of bismuth, prepared chalk, oxide of zinc, and silicate of magnesia (talc).

Subnitrate of bismuth has had a rather curious history. Orfila, reasoning from experiments made upon animals, asserted that the drug was very poisonous, but he had ligated the œsophagus of the animals experimented upon, and it was from this that they had died. Nevertheless he had given the drug such a bad name that it required the repeated assurances of such observers as Bretonneau, Trousseau, and Monneret to restore it to favor. Monneret maintains that it must be given in very large dose and says that we may give as much as 2 or 3 ounces without inconvenience.[1] But the danger of this lies in the fact that the drug is often impure and contains lead or arsenic. Several writers have reported instances of poisoning by subnitrate of bismuth, some of them quite alarming, but they have occurred usually when the drug was used externally as an antiseptic dressing, being applied in large quantities to the open surfaces of wounds. Its internal administration is free from danger, provided rather moderate doses are not exceeded. Soulier says that a daily dose of 150 grains should not be exceeded. Nevertheless we must not forget that inert powders must be taken in sufficient quantity, as otherwise they are inefficacious. Nothnagel and Rossbach, who formerly regarded bismuth as useless, now state that it has an excellent effect when given in doses of 45 to 75 grains in diarrhœa depending upon ulcerative enteritis. Traube explains this favorable action by assuming that the bismuth covers the ulcerated surfaces and thus protects the nerve terminations against irritation by the fæcal matter. At the present time the subnitrate of bismuth is rather going out of employment, being replaced by other salts, especially by the salicylate; the use of the latter has been highly recommended by Vulpian, Desplats, and Dujardin-Beaumetz because of its antiseptic properties, which

[1] Soulier: "Traité de Thérapeutique," vol. ii., page 64.

it owes to the salicylic acid. It is given in doses of 45 to 150 grains a day, often in combination with naphthol (Bouchard). Borate of bismuth, proposed by Delpech, has not been found to be as useful, although boric acid is less irritating to the digestive tube and the kidneys than is salicylic acid. The borate is given in doses of from ½ to 1 drachm a day.

Prepared chalk is a remedy of real merit; it should be used in the rather large doses of from 2 to 5 teaspoonsfuls a day in milk or sweetened water. It is often combined with other substances, such as subnitrate of bismuth, bicarbonate of soda, etc. Prepared chalk being an alkali is particularly indicated in cases of gastric hyperacidity. Lime water is used more especially in the diarrhœas of infancy, where it acts without doubt in virtue of its alkaline properties.

Talc (silicate of magnesia) has been recommended by Debove[1] in chronic diarrhœa and especially in the diarrhœa of phthisis; he gives it in the enormous doses of from 3 to 18 ounces in milk, from 3 to 6 ounces being mixed in each quart of milk. We can go no further in the way of artificial obstruction of the intestine than this, but good results have been obtained from it, nevertheless. This salt has no appreciable taste and is taken readily by patients. We have never given more than five ounces a day, but have never had any fault to find with our results.

Oxide of zinc has been recommended in daily doses of 45 or 50 grains with 10 grains of bicarbonate of soda taken in four doses.

Tannin is the type of intestinal astringents, many substances vaunted as efficacious in the treatment of diarrhœa acting only through the tannin which they contain. It is usually given in doses of 8 to 30 grains a day in pills of 1½ to 3 grains each; it may also be given in solution in a little whiskey and water. When it is desired to act upon ulcerations of the lower portion of the large intestine it may be given by enema in doses of 15 to 30 grains in a

[1] Société des Hôpitaux, June 8th, 1888.

pint of water, with or without the addition of 6 to 12 drops of laudanum.

Rhatany is a very commonly employed astringent, which contains from 20 to 40 per cent of tannin. The extract is the most frequently used form.

Catechu also depends for its efficacy upon the tannin which it contains. The syrup is a common form of administration and may be given in doses of 1 to 3 ounces.

Tannin, rhatany, and catechu, especially the first two, are the most frequently prescribed tannic astringents, but there are a number of other substances which owe their constipating properties to tannin; among these are strawberry root, bistort (polygonum bistorta) tormentilla, walnut leaves, geum urbanum, etc.

Acetate of lead may be useful in cases of intestinal ulceration; it is given in powder, pills, or solution in doses of $\frac{1}{6}$ to 1 and even $1\frac{1}{2}$ grains, up to as much as 7 grains a day. Coto and paracoto barks are no longer employed, having been replaced by cotoine and paracotoine, which are recommended in cases of subacute intestinal catarrh. Cotoine is given in doses $\frac{3}{4}$ to $1\frac{1}{2}$ grains in powder or mucilage, paracotoine in doses of $1\frac{1}{2}$ to 3 grains every two or three hours in powder mixed with sugar.

4. *Intestinal Antisepsis.*—Antisepsis of the intestine can hardly be separated from that of the stomach, and as the indication for its employment is found in a number of different conditions, we have thought best to devote a special chapter to its consideration (See Chapter IX.).

5. *Restoration of the Lost Fluid to the Organism.*—When the amount of water lost has been very great, serious symptoms may result, due especially to heart failure and to the diminution, if not actual suppression, of the urinary secretion. This is seen in very marked degree in cases of cholera and of choleriform diarrhœa. The ingestion of water by the mouth does not suffice to make good the loss of fluid from the intestine, for this water is itself almost immediately rejected. For this reason it has been suggested to introduce water into the system either hypoder-

mically or directly into the veins. Venous transfusion has been much vaunted in France by Hayem and his pupils, and was also largely employed during the last epidemic in Hamburg and in Paris.[1] The temporary improvement following this transfusion sometimes is most startling, and a certain number of actual cures may be credited to it. It is an operation that should be reserved for extreme cases, when collapse is marked and the radial pulse is imperceptible.

But we ought not to wait until the patient is in such extreme danger before restoring the lost fluid to the organism, and long before the radial pulse has disappeared we should practise subcutaneous injections of artificial serum (a five-per-cent solution of chloride of sodium in distilled and sterilized water). The injection should be made deeply under the skin by means of a long needle attached to a tube coming from a vessel raised above the point of injection, or to a sterilized syringe. We may thus easily inject at one sitting 5 or 6 ounces of artificial serum. In certain cases of cholera I have injected in this way more than two pints of fluid. Six ounces can easily be passed under the skin in the course of twenty minutes, and the swelling caused by the presence of the fluid rapidly disappears. It is not only in cases of true cholera that this method can be employed, but it may also be used in any case in which there has been such a loss of water as to endanger the life of the patient, in choleriform diarrhœas of any nature in children as well as in adults, in profuse chronic diarrhœa, malarial or otherwise, such as is frequently met with in hot countries and exceptionally in northern latitudes. Phosphate of soda, which, according to Luton, Crocq, and Peter, would seem to possess remarkable restorative powers, may be added to the salt solution ordinarily employed.

In closing this general study, we must remember that it is not advisable to suppress every diarrhœa of whatever sort; there are some that it is better to leave alone. Bou-

[1] Galliard: "Traitement du Choléra," Gazette des Hôpitaux, Feb., 1893.

chard has seen certain cases of habitual diarrhœa, in a sense physiological, in which untoward symptoms followed the suppression of the discharge. These were doubtless cases in which the flux performed the office of removing toxic substances which, when retained and resorbed, became a source of danger. Uræmic diarrhœa should not be suppressed, for the discharge is salutary and removes the injurious products to which are due the uræmic symptoms. We should even endeavor to restore this diarrhœa when it has ceased, or at times to establish it.

We must limit ourselves to the presentation of these general indications in the treatment of diarrhœa, for to enter upon a consideration of the therapy of the special clinical forms of the trouble would lead us too far, and it would require an entire volume to develop all the very complex elements entering into this question. The treatment of the diarrhœa of children would be more properly discussed in a work on the therapeutics of infantile diseases; the flux accompanying acute indigestion will receive attention in a later chapter; the general principles of treatment of chronic diarrhœa will be discussed in the chapter on enteritis, and for rules concerning the management of the diarrhœa accompanying typhoid fever, malaria, and other acute febrile diseases the reader must consult special treatises on these subjects. We shall note in this place only nervous and morning diarrhœa.

Nervous Diarrhœa.—There are several types of this affection. An impressionable person, more or less neurotic, may be disturbed in mind by some annoyance or disappointment, and then has a sudden attack of diarrhœa. There seems to be a peculiar idiosyncrasy in these cases, and what would cause a flow of tears in others produces in them a diarrhœa.

Tabetic diarrhœa is another of the nervous varieties. The urging to stool is imperative and is repeated ten to twenty times a day in a most monotonous way, although there is frequently but a very small quantity of liquid matter to be passed. This form of the trouble is exceed-

ingly rebellious to treatment and may last for years; in a patient of mine it existed for seventeen years.

Chronic nervous diarrhœa has been well studied by Nothnagel.[1] The cases which he cites are really examples of true psychic diarrhœa. His patients were persons to whom the mere thought of going away from home where they would be at a distance from a water-closet was sufficient to create in them an urgent desire to stool, and this would be repeated several times a day. The disease was a diarrhœic form of agoraphobia. A persistent looseness of the bowels is not uncommon in neurasthenia. We have seen a patient, a pronounced neurasthenic, who could tolerate absolutely no kind of meat, even a small quantity in whatever shape eaten causing a diarrhœa at once. The trouble began during a period of great anxiety in regard to financial matters. Trousseau has reported a case of chronic diarrhœa caused and kept up by the use of tea.

Acute nervous diarrhœa usually passes away spontaneously as soon as the exciting causes are removed, or if not, the enforcement of a few hygienic rules and a dose or two of opium will suffice for a cure. The form depending upon locomotor ataxia resists all treatment. The chronic psychic form calls for moral treatment, which will restore to the sufferer his lost confidence. The same applies also in great measure to the neurasthenic variety. We should observe the general principles of gastro-intestinal antisepsis in regard to diet, and should be moderate in our employment of the medicinal sedatives and antiseptics; such measures as hydrotherapy, massage, electricity, climatotherapy, and mental rest are specially indicated in these cases, and our endeavor should be to restore to the patient his confidence in himself. The moral treatment is here again of the greatest importance.

Morning Diarrhœa.—Guéneau de Mussy and Ollive[2] have described a peculiar clinical type, of which we have seen some examples, characterized by the occurrence of

[1] "Ueber nervöse Diarrhöe."

[2] A. Chaunet, Thèse de Paris, 1888.

several loose passages in the morning but without any return during the day. The condition persists indefinitely. A similar phenomenon is observed rather frequently in cases of hyperchlorhydria, but the treatment here is that of the causal condition. The treatment of morning diarrhœa is mainly dietetic. We must reduce the amount of fluids ingested, forbidding red wine entirely, and prescribe chiefly roast or broiled meat, eggs, and, in moderate amount, milk products, purées of dried vegetables, and stewed fruit. It is often specially useful to diminish the quantity of food taken at the evening meal.

If the stools are fetid we must resort to gastro-intestinal antisepsis; giving chloroform water somewhat diluted, Hayem's lactic-acid lemonade, naphthol, and salicylate of bismuth, or benzonaphthol. The last-named agent is the one that we should prefer to give in these cases.

CHAPTER IX.

GASTRO-INTESTINAL ANTISEPSIS.

THE possibility of auto-intoxication originating in the intestinal canal and the utility of antisepsis of the digestive tract are now well recognized, and it would hardly be necessary to refer to the theory of auto-intoxication at all were it not that we desire to recall the principles upon which treatment is based and to point out some widespread errors on the subject. In the management of this condition we must make a very careful selection among the numerous drugs and formulæ which have been recommended and employed. In our study of the subject we shall begin with the food before its introduction into the stomach and follow it in its course through the digestive tube.

Fermentation of Food Outside of the Body.—Alimentary substances, especially the nitrogenous, while undergoing putrefaction give origin to a number of toxic products which are analogous in their action to the most powerful of the vegetable alkaloids; these are the ptomaïnes which have been studied of late by many observers, and which, when ingested with the foods in which they have been developed, give rise to serious accidents that have been grouped together under the common term botulism. Other substances may be ingested at the same time which, while not yet poisonous, become so in the process of decomposition in the intestine and thus occasion a continuous formation of toxines; this explains the occurrence of certain diseases of slow evolution resembling typhoid fever, which are, however, of the same nature as the more acute phenomena. Decomposing food, therefore, may give rise to poisoning or to infection. We shall see later how to treat

this condition when already established, but first let us study the means of its prevention.

We may prevent the further production of these symptoms entirely in many cases by insisting upon a complete abstinence from food, but this must, from its very nature, be a temporary expedient only. There are two conditions upon which the success of this dietetic treatment depends: (*a*) The avoidance of food already undergoing putrid decomposition, and (*b*) the choice of those articles which not only contain a minimum of toxines and of the germs of decomposition, but which also afford the least favorable field for the occurrence of this process.

(*a*) Whenever there exists a tendency to auto-intoxication, either because intestinal fermentation is excessive or because the poisons are not eliminated through the kidneys or destroyed in their passage through the liver, we must take special care to prevent the introduction of food products already undergoing decomposition. This indication is present not only in cases of gastro-intestinal disease, but also whenever, in consequence of organic or functional trouble of the liver or kidneys, there is absorption or retention in the economy of an abnormal quantity of toxines. In such cases we should forbid all high or richly seasoned meat, strong cheese, etc.

(*b*) Sufferers from auto-intoxication should be allowed to take only perfectly sound articles of food and those which are least liable to become the seat of putrid fermentation within the intestine. This process is especially favored by two conditions, viz., an excessive quantity of food, particularly of nitrogenous food, and the presence of a considerable amount of indigestible residue.

A milk diet fulfils these two indications admirably. It introduces into the digestive tract but a very small proportion of toxines or of micro-organisms, and it leaves a minimum quantity of waste material; it is also easily elaborated and easily absorbed, and furthermore increases the urinary secretion. This is an explanation of its good effects in diarrhœa, enteritis, etc. It is justly entitled to

the first rank among foods suitable for those cases in which auto-intoxication plays an important part in the production of the morbid symptoms. Nevertheless milk may itself furnish a vehicle for the introduction of pathogenic microbes, of the coli bacillus or of the bacillus of lactic acid fermentation, which latter, as Wurtz and Leudet have shown, may occasion the production of toxines by its action upon albuminoid substances. For this reason great care should be taken to see that the milk is fresh, comes from healthy animals, and is as far removed as possible from all causes of fermentation.

Sterilized milk represents the ideal aliment, and it has been found to give excellent results in the treatment of diarrhœa, especial in children. All patients cannot be subjected to an absolute milk diet, for various reasons, but in any case it constitutes a valuable addition to a mixed regimen.

By means of the vegetable diet described in a preceding chapter we are enabled to limit greatly the introduction of nitrogenous substances and to give them in the least injurious form. This dietary consists essentially in milk and dairy products, eggs, and vegetable purées; the food is in a state of minute subdivision and free from all excess of indigestible matter. The fine division of food is inimical to the occurrence of putrid decomposition, as it brings every particle into close contact with the digestive fluids. It is important also to reduce to a minimum the amount of indigestible waste material, whether of animal or vegetable nature. For this reason all fat, vessels, tendons, and aponeuroses, and whatever is not actually muscular tissue, should be removed from the meat; it is chiefly because of this careful preparation that raw meat pulp is of such service in diarrhœa. Cooked meat should be well cooked, for that in itself is a good antiseptic measure. The same indication is met in the case of vegetable articles of diet by serving them in the form of purées. For a further exposition of this important subject of diet the reader is referred to Part II.

Gastric Antisepsis.—When the food has reached the stomach it is submitted to the action of the saliva, which acts upon the starchy matters, and to that of the gastric juice, which acts upon the nitrogenous portions, whether of animal or of vegetable origin. The hydrochloric acid of the gastric juice is a true antiseptic agent, as has been shown by numerous experiments. This antisepsis, however, is never complete and many microbes of fermentation are passed along with the food into the intestine. There are two reasons why natural antisepsis of the stomach is never complete: in the first place hydrochloric acid is not present in sufficiently large amount, and secondly, the period during which the food remains in the stomach is too short for this process to be perfected. Straus and Wurtz found that the gastric juice of the dog, although very rich in hydrochloric acid, required a week for complete sterilization. Even in cases of hypersecretion of hydrochloric acid we often detect an organic hyperacidity resulting from secondary fermentations which the acid of the gastric juice, although in excess, was not able to prevent. We may conclude, therefore, that although there is a true antiseptic power in the gastric juice we must not exaggerate its importance, as has been done by Bouchard in his conception of the pathogenic rôle of dilatation of the stomach.

The interesting experiments of Wasbutzki[1] have shown that the sulpho-acids are increased in cases of hyperchlorhydria. But the sulpho-acids in the urine appear to serve as a measure of the intensity of intestinal fermentation and of putrid auto-intoxication. It is certain that secondary fermentation, manifested by organic hyperacidity, takes place in the stomach when there is stagnation of the food in this organ. This fermentation is locally injurious in consequence of its irritant action upon the gastric mucous membrane and it may well be believed that it may also give rise to toxic products, although experi-

[1] Archiv für experiment. Pathol. und Pharmakologie, vol. xxvi., p 133.

mentally the toxic properties of the contents of the stomach have been demonstrated only in cases of hypersecretion of hydrochloric acid with stagnation complicated by tetany. This toxicity is due, according to Bouveret and Devic,[1] to the presence of imperfectly elaborated peptone. The occurrence of excessive fermentation and of organic acidity can hardly be imagined unless there is stagnation of the gastric contents. Although this stasis may be much less common than has been supposed, it nevertheless exists in certain cases with or without actual lesion of the stomach, and we are therefore justified in devoting a special paragraph to the study of gastric antisepsis.

This antisepsis has been attempted by chemical and mechanical means. We can hardly separate the study of chemical antisepsis of the stomach from that of the intestine, and we may say at once that mechanical antisepsis of the stomach by means of lavage seems to us far better than any chemical methods.

Mechanical antisepsis of the stomach is effected by means of artificial evacuation of its contents through the œsophagus, and this evacuation may be accomplished naturally by vomiting or artificially by lavage. Gastric indigestion naturally terminates by vomiting, just as diarrhœa often puts an end to intestinal indigestion. We have imitated nature in this respect, so that an emetic is the time-honored remedy for acute indigestion.

Lavage of the stomach is less distressing than vomiting, is more easily repeated from time to time, and is also an excellent means of bringing about the removal of the peccant material. It may be made with pure water or boiled water if preferred, but the use of various antiseptic solutions has been recommended, not only as a means of obtaining more complete disinfection, but also with the object of leaving in the digestive tube a more or less considerable amount of a fluid which may moderate the process of fermentation. For this purpose we may employ

[1] Revue de Médecine, 1887.

solutions of boric acid (3 per cent), of salicylic acid (2 or 3 parts per 1,000), of borax (2 per cent), of creolin (0.5 per cent), of thymol (1 : 2,000), and of many other substances, such as resorcin, permanganate of potash, chlorate of potash, chlorate of soda, hyposulphite of soda, chloride of sodium, etc. We may also use solutions of hydrochloric acid (1 or 2 parts per 1,000), and of lactic acid (5 parts per 1,000). It is not improbable that Vichy water, which has recently been employed to some extent in washing out the stomach, increases the natural antiseptic properties of the gastric juice by provoking a greater secretion of hydrochloric acid.

Intestinal Antisepsis.—We may here also practise mechanical antisepsis or resort to the administration of medicinal antiseptics by the mouth. Under mechanical antisepsis we include purgatives and lavage of the intestine by the rectum.

Purgatives have long been used in the treatment of gastro-intestinal indigestion, when the intestinal symptoms predominated, and of certain forms of diarrhœa. It is entirely rational to endeavor to obtain a cleansing of the intestinal tract by means of active purgation. Saline purgatives and aperient mineral waters act well in these conditions. It is well known that constipation usually follows the laxative effect obtained by their use and this explains their beneficial effect in diarrhœa. Calomel is at once a purgative and a mercurial salt. It gives origin in the intestinal tube to a small quantity of the bichloride and to a larger amount of the sulphide of mercury, both of which are antiseptics. In consequence of this calomel has naturally been regarded as the best purgative when it was desired to overcome intestinal fermentation. We may add that its easy administration to children and the good effects which it produces in the diarrhœas of early life has still further won the favor of physicians. Unfortunately there is no proof that calomel administered by the mouth exerts any really valuable antiseptic effect in the intestine, for experiments made to determine this

point have been negative in their results.[1] But in spite of this it remains the remedy of choice in children because of its absence of taste and ease of administration.

Lavage of the intestine is possible only as regards the lower bowel, although it has been pretended, without sufficient proof, however, that liquids may be made to pass beyond the ileo-cæcal valve and enter the lower part of the small intestine. Enteroclysis may be practised with an ordinary stomach tube or by means of a special apparatus devised for the purpose. If the stomach tube is used it should be introduced as far as possible above the sphincters and then, by means of a funnel connected by a long rubber tube with the tube in the rectum, the water is made to enter the intestine. This simple apparatus may be replaced by one specially constructed for the purpose (*entéroclyseur à entonnoir*), but the only advantage of this is that the reservoir may be raised or lowered at will so as to cause the fluid to flow back and forth into and out of the bowel. This manœuvre has been recommended as a good means of breaking up hard masses which have accumulated in the colon. While lavage is being performed the patient should be in a recumbent posture; two or three quarts of water may be used.

Ascending douches, such as are given at certain mineral springs, are only a variety of enteroclysis. The patient sits upon a special machine, the tube is introduced into the rectum, and then a stopcock is gradually opened, letting in the water coming from an elevated reservoir. After a while the excess of fluid escapes between the tube and the sphincter, so that a continuous irrigation of the large intestine is effected. It would, however, be better to practise this lavage with the patient in the recumbent posture, as then there would be a greater likelihood of the water passing well up into the intestine and so washing it out more thoroughly.

Enteroclysis may be made with antiseptic solutions or

[1] Biernacki: Deutsches Archiv für klinische Medicin, p. 87, 1891. Steiff: Zeitschrift für klinische Medicin, xii., p 310.

with naphthol water (3 or 4 grains to the quart), saturated solution of sulphide of carbon, or weak solutions of permanganate of potash or of nitrate of silver (1½ to 7 grains to the quart). Cantani has recommended enteroclysis with a tannin solution in the treatment of cholera. In cases of muco-membranous enteritis Dujardin-Beaumetz advises iodine water (2½ drachms of the tincture to a quart of water) and naphthol water. Bouchard says that a saturated solution of boric acid is very irritating to the mucous membrane of the large intestine, and he warns against its too frequent use.

When the lesion is situated in the lower part of the large intestine and it is not necessary to carry the remedy very far, we may use smaller enemata and more concentrated solutions; we shall return to this when we come to the chapter devoted to the treatment of dysentery.

Medicinal antisepsis has been the subject of much experimentation and there is hardly any antiseptic substance which has not been tried in the disinfection of the intestinal tube. Before enumerating these substances and dwelling upon those which deserve study, we may ask ourselves whether intestinal auto-intoxication really exists and if we are able to combat it effectually.

The reality of intestinal auto-intoxication is shown by: (1) the toxicity of the fæces;[1] (2) the presence in the urine of substances which owe their origin to putrid fermentation taking place in the intestine; (3) the appearance of grave symptoms when the progress of the fæcal matters is arrested (strangulated hernia, intestinal ob-

[1] Gilbert, in an interesting communication made to the Biological Society of Paris (February 25th, 1893), has shown that the coli bacillus which is present in such numbers in the intestine of man elaborates a powerful toxine which, when injected into the veins of rabbits, causes convulsions, coma, and tetanic contractures. It is then very probable that the coli bacillus elaborates in the intestine a quantity of toxine which may be capable of exciting more or less grave symptoms of auto-intoxication. We know that in certain diarrhœas, especially those of early life, the contents of the intestine may be nothing more than a pure culture of the coli bacillus (Lesage).

struction); (4) the diminution of the toxicity of the urine in proportion as that of the intestinal contents decreases.

It is therefore proper to seek to restrain intestinal fermentation when it tends to assume an exaggerated importance, as happens in a number of cases which were formerly grouped under the common name of acute or chronic enteritis, in many cases of constipation, of organic lesions of the intestine of chronic colitis, and when disease of the liver or of the kidney interferes with the destruction of these toxines or with their elimination in the urine. Numerous attempts have been made to effect gastro-intestinal antisepsis. Bouchard's investigations in this regard were epoch-making. At the Copenhagen Congress he laid down certain general rules concerning gastro-intestinal antisepsis. A good antiseptic he said should possess the following properties: it should be insoluble and should be given in the form of an impalpable powder and in fractional doses. It should be insoluble, or at least very slightly soluble, so that it may not be absorbed and produce symptoms of acute poisoning. It should be in the form of an impalpable powder so as to penetrate into all the folds of the mucous membrane and thus become intimately mixed with the fæcal matters. It should be given in fractional doses so as to be spread equally as far as possible throughout the entire length of the intestinal tube. There are, indeed, certain soluble antiseptics which may be given in liquid form and which possess a certain value; we shall mention some of these below. But this does not detract from the value of the general theory of antiseptics as laid down by Bouchard.

This author tried a considerable number of antiseptics before deciding upon beta-naphthol and salicylate of bismuth as the best. He obtained no good results with the sulphites, the hyposulphites, carbolic acid, creosote, and boric acid. Salicylate of bismuth had already been recommended by Vulpian, naphthalin by Rossbach, and the black sulphide of mercury by Serres and Becquerel. Others have recommended hydrochloric acid, lactic acid, salol,

thymol, betol, eucalyptol, iodoform, dermatol, resorcin, benzonaphthol, vegetable charcoal, etc.

We must make a choice among all these substances, and shall begin by eliminating two which are dangerous on account of their poisonous properties, viz., black sulphide of mercury, which may be absorbed in dangerous amounts, and naphthalin, which causes symptoms of vesical and urethral irritation. A certain number of substances owe their antiseptic property to the presence of free or combined salicylic acid; these are salicylate of bismuth and of magnesia, salol, betol, and eucalyptol. They all have the disadvantage that salicylic acid is irritating to the mucous membrane and may occasion serious symptoms to patients whose kidneys do not act well.

Salicylate of bismuth is decomposed into salicylic acid and oxide of bismuth. It possesses some real value and is often employed alone or in combination with other antiseptic and astringent substances. It is given in the amount of 30 to 150 grains a day in divided doses of 7 to 15 grains each.

Salicylate of magnesia is often combined with naphthol when constipation exists, just as salicylate of bismuth is combined with it when there is diarrhœa. It is given in doses of 30 to 75 grains. It has been recommended by Huchard in the treatment of typhoid fever.

Salol is formed by the combination of carbolic and salicylic acids, and breaks up into these substances in the intestine under the influence of the pancreatic juice; it is said to pass into the intestine unaffected by the gastric juice, although this is denied by Reale and Grande. It is often employed as an intestinal disinfectant, and has given good results in cases of infectious diarrhœa.

Betol is a salicylate of naphthol, and is wholly insoluble in the stomach. It is decomposed in the intestine into naphthol and salicylic acid. Hayem says that it temporarily causes a lowering in the amount of free and combined hydrochloric acid and retards gastric digestion, and as it also gives rise to salicylic acid in the intestine it is

less desirable than benzo-naphthol, of which we shall speak later.

Eucalyptol is simply a mixture of carbolic acid and oil of eucalyptus, each one part, and salicylic acid six parts. The large proportion of salicylic acid which it contains and its burning taste render it a rather poor antiseptic of the intestinal tract. It is given in doses of from 60 to 90 grains a day.

Vegetable charcoal is a good antiseptic which Bouchard was for some time in the habit of using in the treatment of typhoid fever. He obtained by means of it a complete deodorization of the fæces, which is a very positive proof of its anti-putrefactive action. He gave it in doses of 3 ounces a day with the addition of 15 grains of iodoform in glycerin. But the author himself confesses that it required real courage to swallow the mixture, and he has on this account given it up notwithstanding its valuable antiseptic properties. Beta-naphthol is the antiseptic preferred by Bouchard, and in consequence of his strong encomiums it quickly made its way into practice and took the first rank among remedies of its class; it is now, however, being in a measure displaced by benzonaphthol. The following is the formula of Bouchard:

℞ Beta-naphthol, ... ʒ iv.
Salicylate of bismuth, ... ʒ ij.

M. Divide into 30 powders. Sig. Take from 3 to 12 powders in the twenty-four hours.

Taken in this way the naphthol deodorizes very effectually the fæcal matters. It acts upon both the intestine and the stomach, but Hayem does not regard this as an advantage. He says that it is an extreme irritant to the stomach and in consequence of this it causes at first an exaggeration of the secretion of hydrochloric acid and later leads to exhaustion of the mucous membrane and a reduced secretion of this acid. Naphthol would in that case be absolutely contra-indicated when there is hyperchlorhydria, and should be given in other cases very cautiously and for not too long a period. As we have said above, naphthol is

often combined with salicylate of bismuth; it may also be given associated with bicarbonate of soda, prepared chalk, magnesia, salicylate of magnesia, rhubarb, etc. Alpha-naphthol, which is even less toxic, is said to possess more marked antiseptic properties.

Resorcin is recommended as a gastro-intestinal antiseptic by some; it is given in solution in doses of 30 to 75 grains a day. The following formula for a gastric antiseptic is given by Menche:

℞ Pure hydrochloric acid,
Resorcin, ... ãã gr. xxx.
Syrup of orange-peel, . . . ʒ v.
Water, ... ℥ vi.
M. Sig. A tablespoonful every two or four hours.

Benzonaphthol, prepared for the first time by Maikopar in 1869, was studied anew by Yvon and Berlioz in 1891.[1] Being almost insoluble in water, it passes through the stomach without being modified and splits up in the intestine into naphthol and benzoic acid; the antiseptic action of the latter aids that of the naphthol and as it is much less irritating than salicylic acid, it follows that benzonaphthol is preferable to betol. The benzoic acid is eliminated in great part by the urine as hippuric acid. Gilbert[2] has found that benzonaphthol has no action whatever upon the gastric secretion and is therefore markedly superior to naphthol in this respect. Given in doses of 60 to 75 grains a day in powders of 8 grains each, it is in no sense injurious, does not disturb digestion, and exerts upon the contents of the intestine an antiseptic action equal to that obtained from 40 grains of naphthol. It would seem to be the intestinal antiseptic *par excellence;* the dose of 75 grains may even be exceeded without danger. Le Gendre[3] has also experimented with a number of antiseptics and gives the preference to benzonaphthol, which he has found useful in very many diseases of the intestines. We have

[1] Société de Thérapeutique, November 11th, 1891.
[2] Société Médicale des Hôpitaux, May 6th, 1892.
[3] Ibid., May 13th, 1892.

also employed it in Asiatic cholera, in cholera nostras, in summer diarrhœa, dysentery, and in acute attacks of muco-membranous enteritis, and have found it to produce excellent results. When, therefore, we desire specially to obtain antisepsis of the intestinal tract we must give the preference to benzonaphthol.

When antisepsis of the stomach alone is aimed at we must resort in the first place to lavage and secondly to one of the following medicinal antiseptics: hydrochloric or lactic acid, chloroform water, sulpho-carbonated water, resorcin, or boric acid. As regards hydrochloric acid we would refer the reader to what has been said *à propos* of the acid treatment of dyspepsia and of dilatation of the stomach.

Lactic acid is considered by Hayem to be an excellent gastro-intestinal antiseptic. After having, with Lesage, observed its good effects in the green diarrhœa of children, he was led to use it with success in a number of other forms of diarrhœa.[1] He gives it in the form of a lemonade composed of ½ ounce of lactic acid to 7 ounces of simple syrup and 25 ounces of water. This mixture, which is easy to take, was much prescribed during the last epidemic of cholera. Most of those who have used it have been satisfied with its action without, however, attaching undue importance to it as a remedy. It is given in doses of half a glass.

In cases of dilatation of the stomach with excessive fermentation, we are in the habit of giving, from time to time, a saturated solution of boric acid in doses of 7 to 10 ounces; this amount is given in several portions while digestion is going on, with apparently good effect.

It may be asked whether gastro-intestinal antisepsis is justified by the results obtained, but independently of the benefits which the patients express themselves as feeling, a number of other facts bear witness to the reality of antisepsis of the digestive tract. On the one hand the bad odor of the intestinal discharges is diminished or abolished,

[1] Académie de Médecine, October 25th, 1887; Société Médicale des Hôpitaux, June 27th, 1890.

and on the other the toxic power of the urine is lessened and the amount of the products of putrefaction which it contains, especially of the sulpho-acids and of cyanuric acid, is reduced. Intestinal antisepsis is, therefore, a palpable fact capable of actual demonstration. Nevertheless it has been doubted. Stern[1] says that the sulpho-acids are an indication of putrefaction only and that they have no reference to infectious or toxic processes going on in the intestine.

The fæces are never completely sterilized by internal antisepsis, and they always offer a medium for microbic cultures. When animals have been fed with a pure culture of the *bacillus prodigiosus*, no matter how powerful the antiseptics administered, nor how large the doses, the microbes are always found in the fæces. But it would not be desirable to sterilize completely the intestinal tract, for then the digestive process would necessarily be suspended. The object is merely to restrict auto-intoxication as far as possible. There is no doubt that this result may be obtained in great measure by the use of purgatives, lavage of the stomach and of the large intestine, by an appropriate diet, and by the administration of suitable antiseptics.

[1] Zeitschrift für klinische Medicin, vol. xii.

CHAPTER X.

DYSPEPSIA.—ACUTE INDIGESTION.

THESE terms express two very different things which yet have so many semeiological and pathogenic points in common that the confusion in their nomenclature appears to be justified. Dyspepsia and acute gastric or rather gastro-intestinal indigestion are symptomatic complexes which correspond often to phenomena of auto-intoxication of digestive origin.

It would perhaps be well to distinguish from the rest nervous dyspepsia, which is to the stomach what nervous diarrhœa is to the intestine. In consequence of some mental or physical shock, received during or soon after a meal, the individual is seized with malaise, pallor, cold sweats, nausea, and giddiness, and soon vomiting occurs and puts an end to the scene. The whole trouble may subside in this way or symptoms of acute indigestion may still remain.

In other cases the symptoms do not appear at once, but after the lapse of a certain time. After a more or less copious repast the person retires and falls asleep without difficulty. At the end of several hours he awakes with a feeling of extreme malaise, of weight on the stomach, nausea, heaviness of the head, and oppression. The face is often pale, sometimes covered with sweat, the pulse is small and rapid. These symptoms are occasionally so severe as greatly to alarm the patient and those about him. They may terminate with copious vomiting or sometimes with a sharp attack of diarrhœa, and the patient recovers after the evacuation of the peccant material; or here again an acute gastric indigestion may succeed to this stormy beginning.

Sometimes gastric indigestion may begin in a suba-

cute form. It is characterized by general malaise, lassitude, a feeling of heaviness in the head or actual headache, anorexia and even a repugnance for food, and frequently a heavily coated tongue. To these initial symptoms may succeed phenomena more directly referable to the intestine, such as colic and diarrhœa.

Sometimes there is an elevation of temperature, acute febrile indigestion, and the fever may be so marked as to lead to a suspicion of typhoid fever, the differential diagnosis at this stage being at times a matter of considerable difficulty or even impossible until the course of the malady has been watched for a certain period.

In some cases the intestinal symptoms are more marked than the gastric. These consist in distention of the abdomen with constipation or in diarrhœa, quite frequently fetid diarrhœa.

It is really to food-poisoning of intestinal origin that these symptoms are due, and in other different cases the semeiological complex is to be explained by an analogous pathological process, viz., auto-intoxication. However, the causes and nature of this auto-intoxication are very different in different cases. Sometimes the person has overeaten and the stomach and intestine are unable to elaborate the great mass of food which then undergoes fermentation. Again it is not the quantity but the quality that is at fault; something already undergoing decomposition has been eaten and has carried with it poisons ready formed and micro-organisms of fermentation.

Simple poisoning will give rise to temporary symptoms; infection to a prolonged morbid condition, sometimes accompanied by fever. Both the intoxications and the infections which may cause acute indigestion are extremely varied, and various also are the symptoms to which they may give rise. All persons are not equally affected by the same cause, for there are many very strange and inexplicable individual predispositions. Some persons, for example, cannot eat duck without suffering almost immediately from colic and diarrhœa, while others cannot partake of

cold fish without paying the penalty in the shape of an attack of acute indigestion. The same toxines do not produce the same effects in everybody, and it is very possible that different individuals elaborate different toxines from the same kind of food.

Any disturbance of the gastro-intestinal movements predisposes to acute indigestion. In certain cases of atonic dyspepsia with a tendency to gastric stasis we see repeated attacks of acute indigestion or an almost permanent morbid condition which is very analogous to it; it is a chronic gastro-intestinal indigestion. It is not improbable that, as Bouchard asserts, the absence or reduced amount of hydrochloric acid plays an important rôle in the production of these symptoms; the natural antisepsis of the digestive tract is wanting. In others it is the atony of the intestine that is at fault; there is a retention of fæcal matters in the bowel and consequent auto-intoxication. From this result the symptoms, with or without fever, seen especially in cases of chronic muco-membranous colitis.

In all cases of gastro-intestinal indigestion, whatever the symptoms may be, there are certain general indications of treatment. We must: (1) remove as rapidly as possible the injurious matters from the stomach or intestine; (2) reduce to a minimum the food poisoning; (3) secure antisepsis of the digestive tube; (4) aid the elimination of the toxines already absorbed. We shall see that the classical treatment of this condition meets very well the indications which modern research has enabled us to express in more scientific formulæ.

1. Removal of the injurious matter from the digestive canal is often accomplished naturally by vomiting and diarrhœa, and the physician has only in this respect had to copy nature; he has produced vomiting when the stomach was or seemed to be chiefly at fault, and purgation when the trouble was located in the intestine. This is the traditional treatment of acute indigestion, and there is no reason for abandoning it now; for every one knows that it usually gives results as speedy as they are good. Nausea,

distaste for food, and a coated tongue, without diarrhœa, call for the administration of an emetic; constipation, especially when there are intercurrent attacks of diarrhœa, abdominal distention, and fetid diarrhœa are indications for the administration of a purgative. In these cases purgative salines, such as sulphate of soda or of magnesia and the citrate of magnesia, are to be employed. We may also use the purgative mineral waters, of which we have a large choice.

Acute indigestion may recur with abnormal frequency in certain patients, especially those who have a tendency to atony of the stomach with stagnation of its contents and those who suffer from habitual constipation. It is evident that here we have to treat the atony of the stomach or intestine. We must also frequently take into consideration the neurotic condition underlying the trouble.

2. The prevention of food poisoning is best obtained by a milk diet. When we cannot keep the patient on milk alone we must reduce the amount of food to a minimum and give only those articles which are most easy of digestion; boiled eggs are very useful here. For a further consideration of the diet suitable to these cases the reader is referred to Part II.

3. Antisepsis of the Digestive Tube.—This is accomplished mechanically by emetics and purgatives, to which we may add lavage of the stomach in cases of atonic dilatation. When there is marked tendency to vomiting we may give chloroform water. In cases of diminished secretion of hydrochloric acid, with organic fermentation in the intestine, accompanied by acid eructations and an acid or fetid breath, we may give hydrochloric or lactic acid lemonade. The same result would doubtless be obtained by the administration of small doses of an alkali before meals. It is a common practice in these conditions to give alkaline mineral waters with milk, the good results of which are doubtless due to the fact that the secretion of hydrochloric acid is thereby momentarily increased. The existence of diarrhœa, especially of fetid diarrhœa, is an

indication for the administration of medicinal antiseptics, such as salol, naphthol, salicylate of bismuth, and preferably, for the reasons given above, benzonaphthol.

Elimination of the Toxines.—It is not sufficient to prevent the production of new toxines by means of diet and of gastro-intestinal antisepsis, and to get rid of those remaining in the intestinal tract, but we must also do what we can to favor the elimination by the kidneys of those which have been absorbed. To do this we must provoke diuresis by means of milk and of mineral waters; it is not necessary to resort to other diuretics.

Sometimes the vomiting by which an attack of acute indigestion has been terminated becomes excessive and continues longer than is necessary. This must be combated by ice, iced drinks, Rivière's potion, chloroform water, and cocaine.

An attack of acute indigestion is sometimes followed by more or less prolonged anorexia. For this we may resort to bitter tinctures, especially gentian and calumba, or nux vomica with the addition of a small amount of tincture of ipecac. It is far better to give these bitters after a meal, while digestion is going on, rather than, as is commonly done, before eating.

The exclusive use of hot drinks at meals is often very useful in those who have a tendency to nervo-motor atony of the stomach.

CHAPTER XI.

GASTRIC AND INTESTINAL HEMORRHAGE.

THE treatment of profuse hemorrhage is very nearly the same, whether it occurs from the stomach or from the intestine. The first indication is to secure absolute rest for the patient in a recumbent posture. An ice-bag may be applied to the epigastric region if the bleeding comes from the stomach. Only liquid food, preferably cold milk, should be given. Little bits of ice should be swallowed whole and not be allowed to melt in the mouth.

We should endeavor as soon as possible to obtain immobilization of the stomach and intestine. Opiates may be given for this purpose, either morphine hypodermically, or laudanum by enema. The most useful preparation in such cases is perhaps the extract of opium, which should be given in doses of 1½ to 2 grains in pills. This not only quiets the movements of the intestine, but it appears also to have a general hemostatic action; it is as useful in hemoptysis as in gastro-intestinal hemorrhages.

The perchloride of iron is much employed, although its internal hemostatic effect has been doubted. It may be given in doses of 15 to 60 minims in divided portions, to which a drachm of Rabel water may be added. Rabel water contains 100 parts of sulphuric acid to 300 parts of ninety-per-cent alcohol; it is thus a sulphate of ethyl. Perchloride of iron and sulphuric acid, as well as the different tannic astringents, should not be employed in cases of gastric hemorrhage due to ulcer, because they might increase directly the acidity of the stomach or stimulate the secretion of hydrochloric acid.

If the means just indicated do not suffice to arrest the hemorrhage we may resort to ergot or its derivatives, er-

gotin or ergotinin. We may give from ½ to 1 drachm of Bonjean's ergotin in a solution which is to be taken in tablespoonful doses during the twenty-four hours. For hypodermic injection we prefer Yvon's ergotin or Tanret's ergotinin to Bonjean's preparation. Yvon's ergotin corresponds to an equal weight of ergot. Tanret's ergotinin is administered in doses of $\frac{1}{240}$ to $\frac{1}{60}$ grain.

Hemorrhages from the stomach or intestine may be so profuse as directly to endanger the life of the patient, and it may be necessary to combat the acute anæmia, resulting from this loss of blood, by transfusion. In the place of transfusion of blood we may give hypodermic injections of artificial serum in doses of from 2 to 7 ounces at least. This is an excellent means of improving the heart's action.

PART IV.

DISEASES OF THE STOMACH AND INTESTINE.

THE details upon which we have dwelt *à propos* of the treatment of the different varieties of dyspepsia and of the symptoms met with in diseases of the stomach and intestine will help us greatly in our study of the treatment of those diseases which have a definite anatomical basis.

The diseases of the stomach the special therapeutic management of which we are about to consider are the following:

Gastritis.

Simple ulcer and ulcerative gastritis.

Cancer.

Among the diseases of the intestine we shall take up the treatment of the following:

Enteritis.

Dysentery.

Typhlitis and appendicitis.

Intestinal occlusion and obstruction.

Cancer of the intestine.

Intestinal parasites.

The treatment of gastric and intestinal hemorrhage has been studied in a previous chapter.

CHAPTER I.

GASTRITIS.

THE term gastritis has been greatly abused in the past, and still is. Many who are even yet under the influence of Broussais regard inflammation as the basis of dyspepsia, while others, on the contrary, look upon the nervous element as the predominating one. This is hardly the place to enter upon theoretical discussions, but nevertheless, as the treatment must be founded in great measure upon etiological considerations, we think it well that there should be no misunderstanding as to what we conceive to be the relation between dyspepsia and gastritis.

While we are persuaded that dyspepsia may exist without gastritis, we yet believe that inflammation of the stomach may be in certain cases the primary lesion, and that it may also be superadded to what is at first a purely nervous dyspepsia. Very often, however, we can hardly determine which of the symptoms are referable to inflammation of the mucous membrane of the stomach, and we ought not to pay undue attention to it in our considerations of treatment. The certainty of the existence of diffuse gastritis would not add much to the indications already present and would hardly lead us to modify in any important particular our therapeutical conduct of the case. The fact of gastritis being present would have a greater bearing upon the prognosis than upon treatment. Nevertheless the existence of gastritis may occasionally furnish some indications of value, otherwise there would be absolutely no use in devoting a special chapter to its consideration.

The inflammations of the stomach may be divided into acute and chronic; and acute and chronic gastritis may be further subdivided according as we regard the condi-

tions from a point of view of etiology or of pathological anatomy.

According to their intensity we shall divide the acute forms of gastritis into mild and severe; and the chronic forms into gastritis with hypersecretion of mucus, gastritis with hypersecretion of hydrochloric acid, atrophic gastritis, and submucous gastritis with hypertrophic sclerosis. We might add ulcerative gastritis, but it is more natural to consider the treatment of that in connection with simple ulcer of the stomach. We may also distinguish between primary and secondary gastritis, according as the inflammation will explain the greater part of the symptoms observed or as the morbid state is dominated completely by a lesion or a disease of which the gastritis is the consequence. We shall not concern ourselves particularly with these secondary forms of gastritis.

Finally, gastritis may be secondary to other diseases of the stomach, such as atonic dilatation with stagnation of the stomach contents, dilatation of mechanical origin, cancer, etc. In these conditions it always aggravates the primary state.

Acute Gastritis.—The older writers looked upon a great number of distinct affections as varieties of gastritis or gastro-enteritis. Their view of the case was much too simple a one, for in reality the matter is extremely complicated. And now that we have learned to distinguish many other elements, such as auto-intoxications, the rôle of the nervous system, etc., we are greatly embarrassed to determine just where the symptoms attributable to gastritis, to acute gastritis in particular, begin. Dyspepsia and acute indigestion were formerly regarded as acute gastritis; is this condition present in the indigestion and gastric intolerance following alcoholic excesses? Possibly; but if it is, the lesion is a superficial and temporary one and quickly curable.

Acute gastritis is much more easily diagnosed when the inflammation is severe than when it is mild. The symptoms of toxic gastritis are very intense. After the inges-

tion of an irritant poison, such as an acid or alkali in concentrated solution, there are repeated attacks of vomiting, sometimes of blood, severe pain occurring spontaneously, or provoked by palpation of the epigastric region, a small and rapid pulse with an anxious face, drawn, and covered with sweat. We think that a certain diagnostic importance should be attached to the tenderness on pressure over the epigastric region and especially along the greater curvature of the stomach.

The presence of acute inflammation of the stomach affords an indication for absolute rest of the organ. During the first few days of a hyperacute toxic gastritis, hypodermics of morphine must be given to quiet the pain and to restrain the movements of the stomach, ice should be applied over the epigastric region, and we must restrict, as far as possible, the amount of fluid introduced into the stomach. We may give small pieces of ice to moderate the thirst, but it is better to give small enemata, which the patient must endeavor to retain, in order to supply to the organism the amount of fluid that it needs. In very grave cases we may have recourse to hypodermoclysis.

In less severe cases, or after improvement has begun, the patient should be placed upon a milk diet and should take alkalies in large doses; the management of the case is very much the same as that suitable to ulcerative gastritis; as a sedative we may give a little opium or morphine.

In very mild cases, which are destined to recover soon, rest to the organ at the beginning, consequently abstinence from food, and then a milk diet with the gradual addition of bland food, alkaline waters, and hot drinks will fulfil satisfactorily every indication.

Of *suppurative gastritis*, which is a very rare condition, we shall say but a word. It is an exceedingly grave disease, which often develops with general symptoms of great severity, the diagnosis of which is difficult. It should be treated in the same way as a hyperacute toxic gastritis. The fever and the typhoid symptoms are chiefly to be combated.

Chronic Gastritis.—The presence of mucus in the vomited matters has long been considered as characteristic of catarrhal gastritis. The mucous glands in the epithelial coat of the stomach may, in cases of mild, superficial inflammation, pour out a considerable quantity of mucus. In more severe and more deeply seated cases the principal (adelomorphous) cells themselves may undergo mucous transformation and also furnish their contingent of mucus. On the other hand, the border or delomorphous cells would betray their excitement by an exaggerated secretion of hydrochloric acid. There are, therefore, two varieties of chronic catarrhal gastritis, mucous and acid. There may also be an atrophy of the glandular elements—atrophic gastritis—and finally submucous hypertrophic sclerosis, the plastic linitis of Brinton.

Gastritis with Hypersecretion of Mucus.—There is no question as to the hypersecretion of mucus in many cases of chronic gastritis, but the presence of this substance is not always easy of demonstration. A certain amount of ropiness of the vomited matters is not necessarily due to the presence of gastric mucus, for the slowness of filtration of the gastric juice may be due to the presence of dissolved albumins. Finally it is difficult to determine how rich the gastric juice is in mucus merely from the opalescence due to the precipitation of mucin by acetic acid. An excessive secretion of mucus does not preclude a hypersecretion of hydrochloric acid, and on the other hand it may go along with a diminished secretion of this acid. The mucus disappears when there is complete atrophy of the mucous membrane. That would be a sign of very grave prognostic import. From what we have said, therefore, chronic gastritis may coexist with all the chemical varieties of dyspepsia.

In general this condition calls for no special treatment directed to itself alone. The excess of mucus, however, is regarded as harmful, for it coats the particles of food with a sort of varnish which isolates them and renders them rebellious to the action of the gastric juice. For this

reason attempts have been made to prevent the excessive secretion of mucus by means of alkaline waters, taken in the form of beverages or used in lavage. Lavage of the stomach certainly is of benefit when there is at the same time an exaggerated secretion of mucus and a tendency to stagnation of the contents of the stomach. The lavage in such cases should be made with alkaline water.

Gastritis with Excessive Secretion of Hydrochloric Acid.—Whether gastritis exists or not, the treatment of hyperchlorhydria is always that which we have indicated above; and the reader is referred to the instructions there given.

Atrophic Gastritis.—Every severe and long-continued inflammation of the stomach tends to produce atrophy of the mucous membrane and dilatation of the organ; in this way are produced those cases of extreme dilatation, the treatment of which we have already discussed. We must not forget that pernicious anæmia has been referred to atrophic gastritis as its cause.

Gastritis with Submucous Hypertrophic Sclerosis.—It is sometimes very difficult to distinguish the symptoms of this condition from those of cancer of the stomach, and the diagnosis is not always easy even on the post-mortem table or under the microscope. The gravity of the affection is hardly inferior to that of cancer and its treatment would be the same.

CHAPTER II.

SIMPLE ULCER AND ULCERATIVE GASTRITIS.

WE shall not here discuss the numerous and diverse theories which have been offered in explanation of the production of simple ulcer of the stomach,[1] for we think that the subject does not admit of discussion. The doctrine to which we hold is that of gastritis as put forth by Cruveilhier. The presence of gastritis in these cases has been demonstrated by Laveran, Galliard, Jaworski and Korckzinski, and ourselves. However, this in itself is not sufficient to give rise to an ulcer, and there are other conditions which are indispensable in order that an ordinary simple gastritis may pass into ulcer of the stomach. The inflammation must be patchy in character and not uniformly involving the mucous surface; if the mucous membrane between these patches is healthy or but little affected it will continue to furnish an active gastric juice; this will act upon the spots of inflammation where there is a collection of embryonal elements possessing but slight vital resisting power. Furthermore, there is in a great majority of cases of ulcer of the stomach an increased secretion of hydrochloric acid, and this renders auto-digestion of the affected portions of the mucous membrane still more easy and probable. The coexistence of hyperchlorhydria and of a real gastritis is the most frequent pathogenic condition of simple ulcer, and it makes little difference whether the hyperchlorhydria or the gastritis is the first in point of time.

Ulcerative gastritis differs from simple ulcer in that

[1] See Debove and J. Renaut: "Ulcère de l'Estomac," Bibliothèque Charcot-Debove, 1892; Albert Matthieu: "Pathogénie et Traitement de l'Ulcère de l'Estomac," Gazette des Hôpitaux, 906, 1892.

there is little or no auto-digestion. The gastritis is much more extensive and deeper and the ulcerations result from inflammatory action entirely; there is an excessive desquamation of the epithelium, and the embryonal elements which accumulate in the mucous membrane become disintegrated and are rubbed off. As a result of this process we see extensive, irregular, and disseminated losses of substance. Ulcerative gastritis is essentially a gastritis which has lasted for a long time, being maintained by the constant repetition of the same causes, the abuse of alcohol, for example. Although it is difficult to define the limit between ulcerative gastritis and simple ulcer, there is, nevertheless, a very appreciable difference as regards pathogenesis, the nature of the affection, its evolution, and the extent of the lesions. As we shall see later, there is much less difference in the treatment of the two.

In a case of simple ulcer, which, as we have said, results from the auto-digestion of inflamed spots of the mucous membrane, the lesion is clean-cut as with a punch and generally more or less rounded. Hemorrhage or perforation may occur very early. The pain is usually quite severe, and this is an advantage because it obliges the patient to seek medical advice, and then, thanks to the régime instituted, further inflammation and destruction of the mucous membrane are arrested. The mucous membrane may be eaten away at several points, but the ulcer is not rarely single, for the simple reason that the intensity of the symptoms forces the patient to submit to treatment. We see what clear indications for treatment this simple and satisfactory theory of ulcer of the stomach offers, and how well it explains the good results obtained by a milk diet and the administration of alkalies.

The principal symptoms of ulcer of the stomach are pain coming on after the ingestion of food or drink, a pricking pain, pain excited by pressure over the epigastrium, and vomiting, especially vomiting of blood. The hematemesis accompanying ulcer of the stomach is ordinarily abundant. The blood is usually unaltered. It may also, when the

hemorrhage has been profuse, be found in the stools as melæna. Certain symptoms attributed to ulcer are in reality due to the concomitant hyperchlorhydria, especially the pain coming on three or four hours after eating, which has been supposed by some to be a sign of the pyloric seat of the ulcer.

The peptic ulcer may be situated in the lower part of the œsophagus, near the cardia, or in the first part of the duodenum, between the pyloric valve and Vater's ampulla. It is, when situated in either of these two places, of exactly the same nature as the gastric ulcer, but the symptoms are somewhat different. An ulcer in the lower portion of the œsophagus causes pain at the end of deglutition; the passage of a sound, which is dangerous, however, permits us to determine its exact location. In the case of ulcer of the duodenum the spontaneous pain occurs late and that which is provoked by pressure is felt below and to the right of the hollow of the epigastrium. This duodenal ulcer often gives rise unexpectedly to very profuse hemorrhages, which may even endanger life; the blood may flow back into the stomach, but usually it is wholly evacuated through the bowels.

We shall take up first the question of the treatment of the ulcer itself, and then of that of its complications, that is to say, hemorrhage, vomiting, and perforation of the stomach.

To Cruveilhier is due the merit, not only of distinguishing simple ulcer from cancerous lesions of the stomach, but also of establishing the value of a milk diet in the treatment of this affection. His object was to obtain as complete rest as possible for the organ. This is indeed an indication which should be met in all cases, and we should endeavor to secure rest, not only of the motor, but of the secretory functions. The theory of auto-digestion has brought forward another indication, that of neutralizing the gastric juice in order to render it inactive.

There is no more radical means of obtaining this end than absolute abstinence from food. The water necessary

for the organism should be introduced subcutaneously or by the rectum. We may give each day several small enemata of boiled water of, say, three or four ounces each, so as to secure the absorption of about a pint a day. If the patient cannot retain these enemas we must resort to subcutaneous injections of sterilized water, or, better yet, of a 0.5-per-cent solution of chloride of sodium.

Nutrient enemata of peptone, milk, or yolk of egg have been recommended, but we do not regard them as of much value. The peptone is often badly borne; the milk and yolk of egg may be better tolerated, but even they are often irritating to the rectal mucous membrane, in which case injections of simple water are much preferable. If only the patient receives a sufficient quantity of water, a fast of several days' duration is void of danger. We might try the addition of the yolk of an egg to each of the enemata, or even give injections of two or three ounces of milk of beef tea with one-half to one ounce of brandy. But we must not insist upon these if they are not well tolerated.

The patient should remain absolutely quiet in bed in severe cases in which there is excessive pain, repeated vomiting, and profuse hematemesis. Laudanum by enema or hypodermics of morphine may be given to secure, as far as possible, absolute rest of the stomach. The precautions taken should be the same if we have reason to fear perforation.

We must reduce the secretion of the gastric mucous membrane to its minimum, with which object we should forbid solid food and irritating drinks, putting the patient on a milk diet. This is absolutely necessary at the beginning of the trouble. Milk is a complete food, as little irritating as possible, which neutralizes the free hydrochloric acid of the gastric juice. This theory explains admirably the good results obtained by its use in practice. The milk should be given in small quantities at intervals; it should be cold, boiled or raw, not sweetened, and should be given in the amount of about two quarts a day to begin with; at the end of six or eight days the amount may be raised to

three quarts. It is well to add about three ounces of lime water to each quart of milk; the lime water in this proportion has only a feeble alkaline action, nevertheless it appears to have an excellent effect on the pain.

The disadvantage of milk is that it is an aliment very rich in fat, sufficiently rich in nitrogenous substances, but poor in carbohydrates. An adult requires a considerable amount to maintain nutrition (about six quarts) which cannot be taken continuously without incurring the risk of dilatation of the stomach. An exclusive milk diet is good enough for the first week or two of treatment, but after that it becomes insufficient. For this reason Debove suggests the addition of food powders, especially meat powder. At the end of the first week of treatment by milk alone we may give each day one, then two, and finally three ounces of meat powder in water or milk, flavored with a little peppermint. We ought not to add any rum or brandy as we would in the case of tuberculosis. The amount of meat powder may be increased gradually up to three, four, or even seven ounces a day, but unfortunately it is often difficult to make the patients take such a considerable volume of this substance. When the patient acquires such a disgust for this food as absolutely to refuse it, we must have recourse to the stomach tube. The tube should be introduced only with great care, after painting the pharynx, if necessary, with cocaine. It is not necessary to pass it into the stomach, but we may stop half-way down the œsophagus. We must avoid as far as possible exciting the stomach to contraction or increased secretion and, before all, we should not irritate the mucous membrane directly by a foreign body. When it is found that the sound can be introduced without much trouble, it may be used for the introduction of alkalinized meat powder once or twice a day. This method of gavage gives excellent and speedy results whenever it can be employed.

Secretory repose of the stomach is obtained in a large measure by the use of milk, of meat powder, or of milk powder, but it is mainly obtained by neutralizing the acids in excess. Alkalies in large doses are to be administered

in the manner described when speaking of hyperchlorhydria. At the beginning, when the patient is on an absolute milk diet with or without lime water, a small quantity (2½ to 4 drachms) of bicarbonate of soda a day will suffice. The soda may be simply added to the milk, or better, is given in powders dissolved in a little water or milk whenever the pain reappears, as it tends to do when the neutralizing effect of the milk on the gastric juice ceases. We may also give the powders regularly every hour. Debove gives from fifteen to twenty powders a day, each composed of 3 grains of prepared chalk and 10 of bicarbonate of soda. The two substances should be as intimately mixed as possible, so as to prevent the chalk from becoming caked and forming concretions in the stomach.

The dose of the alkali should be increased when the patient begins to eat again. We may then give from 5 to 8 drachms of bicarbonate of soda, or an equivalent amount of some other alkali, according to the indications which we have laid down in discussing hyperchlorhydria. Debove gives one of the following powders every half-hour for the three hours after a meal:

℞ Bicarbonate of soda, ... gr. xv.
Prepared chalk,
Calcined magnesia, ... āā gr. iij.

That amounts to a dose of 1½ drachms of bicarbonate of soda and of 18 grains each of prepared chalk and magnesia after each meal. When there is diarrhœa the chalk alone may be given, and when there is constipation the chalk may be omitted from the mixture.

By means of this diet and medicinal treatment we have brought the patient to the time when he can take something more than milk and powdered meat. He must still avoid everything that may irritate the mucous membrane of the stomach, conducting himself exactly as if he were suffering from hyperchlorhydria. Wine and alcoholic beverages are to be forbidden as well as highly seasoned food and irritating medicaments. The meat should be

well cooked and in a state of fine division, all the indigestible portions being carefully removed; vegetables should be given in the form of purées, and green vegetables allowed only when convalescence is well established. The diet list of Leube may be consulted when the time comes for a gradual return to a normal dietary. We must never forget that relapses are very common in simple ulcer, doubtless because the tendency to hypersecretion of hydrochloric acid persists.

Pain is sometimes very severe in cases of gastric ulcer, but it often yields to neutralization of the gastric juice by alkalies and in that case no further medication is needed. Occasionally, however, this is not sufficient and then we must resort to direct sedatives, such as opium, morphine, chloroform water, cocaine, or extract of cannabis indica. For more explicit directions as to dosage and mode of administration the reader is referred to Chapter IV. of Part III., in which the treatment of pain is discussed. We must be careful about the hypodermic administration of morphine in these cases because of the facility with which such patients acquire the morphine habit.

Occasionally the vomiting is so persistent and frequent as to demand a special treatment in addition to that by alkalies and milk. Rivière's potion is not admissible here because the evolution of carbonic acid gas to which it gives rise may occasion a dangerous distention of the stomach and thus lead to perforation. For the same reason all gaseous drinks should be forbidden. Lavage is also contra-indicated, as it may provoke hemorrhage as well as perforation. In cases of long standing in which no hemorrhage has occurred for some time, we may try gavage which is often an excellent remedy against vomiting. One of the most simple means of quieting the stomach is to give little morsels of ice which should be swallowed whole and not allowed to dissolve in the mouth; cold drinks may also be of service. If these measures do not suffice we must resort to the remedies above enumerated for the relief of pain.

The list of substances which have been employed to combat vomiting is a very long one, and sometimes success has occurred most unexpectedly. Lasègue has given tincture of iodine, 15 drops in 5 ounces of sweetened water, a tablespoonful of which is taken every two hours. Debove and Renaut recommend hydrocyanic acid, 5 to 15 drops of a one-per-cent solution.

Rosenheim has recommended the use of nitrate of silver in hyperæsthesia of the mucous membrane, and we have several times obtained good results from its employment in obstinate vomiting. Two teaspoonfuls of a solution of two or three parts per thousand of distilled water may be given three times a day. Nitrate of silver has also been advised as a topical remedy to promote cicatrization of the ulcer, but it is difficult to see how this effect can be obtained, for it is probable that the salt is immediately decomposed in the presence of hydrochloric acid and the chlorides. If this be so, the only advantage of administering nitrate of silver would be to neutralize a portion of the hydrochloric acid, an action which may well be ignored. Other substances which have been proposed for the purpose of causing cicatrization of the ulcer are of no more value than this. The whole list of so-called cicatrizing agents may therefore be dismissed as of no use whatever.

Complications.—These are immediate, such as hematemesis and perforation, and remote, such as dilatation of the stomach from cicatricial stenosis of the pylorus. The treatment of hemorrhage from the stomach is discussed in chapter XI. of Part III. Properly speaking there is no medical treatment of perforation. When it occurs it leads at once to a hyperacute peritonitis of the most serious character. The physician should know, however, when this accident occurs that the supreme resort is immediate laparatomy. If the surgeon could readily find the point of perforation, if the contents of the stomach had not been scattered over too great an extent of the peritoneal surface, it would not be impossible to cleanse the peritoneum, unite by suture the edges of the ulcer, and thus obtain cicatriza-

tion. In the presence of the immense danger of perforation the attempt to close the opening by suture would be justifiable.

One of the most common and serious of the remote complications of gastric ulcer is cicatricial narrowing of the pylorus with consequent dilatation of the stomach. We have already considered this subject and must refer the reader to the chapter on dilatation. The only cure is a surgical one. Gastro-enterostomy is the operation which appears to present the fewest dangers and to promise the best results.

CHAPTER III.

CANCER OF THE STOMACH.

NOTWITHSTANDING the incurability of the disease, the physician should not be discouraged when he finds himself in the presence of carcinoma of the stomach, for he may often be able to render signal service to his patients in relieving some especially distressing symptom, in bringing up their physical strength and spirits, and in lessening their suffering.

The medical treatment of the disease is unfortunately exclusively symptomatic. The remedies which have been vaunted one after the other as specifics have each in turn been shown to be worthless. The latest and the most celebrated of these was condurango; this drug came from South America with the reputation of being a cure for cancer, which was credited at first by many even excellent physicians who were led for the moment to believe that they had actually witnessed one or more cures of carcinoma. But this triumph was short-lived, and condurango soon fell back into the rank of simple stomachics, perhaps even of the second order. Let us see what are the symptoms which we may hope to relieve in a measure by our intervention.

A milk diet is eminently serviceable in a large number of cases, as this is the food which the patients usually tolerate the best. Under the influence of milk we may see vomiting cease, pain grow less, and the general strength improve, the amelioration being sometimes so marked as to lead the medical attendant to suspect the correctness of his previous diagnosis. The addition of a little lime water to the milk will often cause it to be better borne by the

patient. In certain cases we may try gavage with meat powder, eggs in various shapes, milk soups, purées, and some of the numerous nutritive powders that are on the market. It is not often, however, that this varied diet can be continued for a long time, and we are generally forced to return to the milk.

Anorexia is common in cases of cancer of the stomach, and is rather difficult to overcome with the ordinary remedies such as mineral waters, bitters, or acids, especially hydrochloric acid. A better result is sometimes obtained by lavage. It is not uncommon to find dilatation with stasis as a complication, especially when the lesion is situated near the pylorus with consequent narrowing of this orifice. Solid and liquid food and the various products of secretion accumulate in the stomach and undergo organic fermentation. In such cases vomiting ordinarily supervenes at the end of a few days and the patient expels in mass all that has been accumulating in the stomach. But this result is more quickly and better obtained by lavage. The stomach may be washed out with simple boiled water or with any of the antiseptic solutions previously mentioned. We may by this means spare the patient the feeling of malaise which an overloading of the stomach causes, the fatigue of vomiting, and the pain excited by contact with a superacid fluid, and we may also in a certain measure prevent the auto-intoxication due to abnormal fermentation.

In most cases of carcinoma there is a marked diminution or actual suppression of hydrochloric acid, and this is an additional cause of the secondary fermentation of the retained contents of the stomach. The attempt has naturally been made to supply artificially the missing acid, but without much success, it must be confessed. I formerly gave hydrochloric acid in these cases, without seeing any marked benefit from its use, but have recently abandoned it, being led to this by a consideration of what occurs after gastro-enterostomy in cases of cancer of the pylorus. The operation does not cure the disease, but it does often bring

about a very noticeable improvement in the local and general conditions, showing what an important part the pyloric stenosis plays in the production of many of the symptoms. But furthermore, curiously enough, the pain also disappears. This is to be explained by the fact that the stomach contents no longer come in contact with the cancerous ulceration, but pass directly into the small intestine along the new route opened up by the operation. One of the most important indications is, therefore, to relieve the stomach of its overload and to render its contents less irritating by reducing their acidity. It is evident that this can be done better by lavage and the administration of alkalies than by the exhibition of hydrochloric acid.

With the object of reducing gastric fermentation we may give chloroform water, sulphocarbonated water, naphthol, or a solution of boric acid. We must not forget that cancer of the stomach can hardly exist without an extensive gastritis, and that certain antiseptics are very irritating to the inflamed mucous membrane. A saturated solution of boric acid appears to do well in these conditions; it may be administered in doses of 5 to 10 ounces a day.

The imperfect elaboration of the food and the more or less impermeability of the pylorus may be the occasion of actual inanition. This might be easily obviated if we could but fabricate peptones and other products of artificial digestion which would be directly assimilable, but unfortunately peptones are not usually well borne and often cause vomiting or diarrhœa. The attempt has been made to nourish the patient by the rectum. We can easily effect the absorption of five or ten ounces, or even more, of water through this channel, but it is much more difficult to get the patient to tolerate peptones, eggs, milk, or more or less concentrated bouillons which have been given as nutrient enemata. A little brandy may sometimes be absorbed by the rectum and is useful as a tonic. We may also give caffeine or phosphate of soda by hypodermic injection for tonic purposes.

The pain accompanying cancer of the stomach is some-

times atrocious. We have shown how much relief can be afforded in certain cases by lavage and the administration of alkalies, and when these do not suffice we must resort to the ordinary analgesics. In these cases we may give opiates without reserve, for there is no such reason to fear the establishment of the opium habit here as there is in simple ulcer.

The mechanism of the vomiting is not always the same in all cases. We have already spoken of the emesis occurring as a relief to a surcharged stomach; this is exceedingly copious and recurs at rather long intervals. Sometimes vomiting comes on at the end of an attack of severe pain; this is, without doubt, of reflex origin and is produced in the same way as the emesis of simple ulcer or of hyperchlorhydria. In other cases there are attacks of acute indigestion which terminate in vomiting; these are amenable to treatment by lavage. The reflex vomiting which accompanies the painful crises is to be treated by analgesics, cracked ice, chloroform water, carbonated beverages, etc.

Gastrorrhagia calls for the ordinary treatment of hemorrhage.

In conclusion we may say a few words concerning the surgical treatment of carcinoma of the stomach; this may be curative or palliative in its aim. A curative treatment should be undertaken deliberately in only a very small number of cases. In order that intervention may have any chance of success it must be done very early, and the cancerous lesion must be removed in its incipiency before it has had an opportunity to invade much of the stomach tissue and before there is any secondary adenopathy. Unfortunately the diagnosis is usually made too late, and when laparatomy is performed we find ourselves in the presence of extensive adhesions, of a more diffuse lesion than we had anticipated, and of already implicated glands.

The palliative operation (gastro-enterostomy), which consists in establishing a communication between the pyloric end of the greater curvature of the stomach and a loop of the neighboring portion of the intestine, is more often

realizable. We have already shown how great an amelioration of all the symptoms may follow this operation, but it is unfortunately at the best only palliative and we can never hope to obtain a permanent cure by this means.

All this is little encouraging, it is true, but, as we said at the beginning of this chapter, it is the duty of the physician to struggle as best he can against the progress of the disease. He will always be able to help his patients, and that is something. Furthermore, the diagnosis of cancer is sometimes wrongly made and we may occasionally obtain a cure most unexpectedly. This is worth bearing in mind, for a case of this nature which would almost inevitably die if left alone may possibly recover as a result of active and methodical treatment. We should always act as if we were in the presence of one of these cases of false cancer.

CHAPTER IV.

ENTERITIS.

WHAT we have said concerning gastritis is equally applicable to enteritis. If the former has been considered the sole cause of dyspepsia so has the latter been regarded as a synonym of diarrhœa; this is a double error, since every diarrhœa does not rest upon enteritis as a cause nor does every case of enteritis have diarrhœa as a symptom. While diarrhœa is common in acute enteritis, constipation is more frequent in the chronic form. Many of the rules for the treatment of enteritis will be found given in the chapters on diarrhœa, constipation, and intestinal antisepsis. Space will permit us to consider here only a few complementary indications furnished especially by the different clinical forms of intestinal inflammation.

Let us consider first what are the symptoms by means of which, according to Nothnagel, we may locate the seat of the inflammation. When the scybala are coated with mucus there is an inflammation of the descending portion of the large intestine. Mucus, when present in the form of whitish fragments or of more or less extensive membranes, indicates a chronic muco-membranous colitis. If the mucus is intimately mixed with soft or watery discharges, the inflammation probably reaches as far as the cæcum. The presence of pure bile is a sign of extensive inflammation of the small intestine. This bile often stains the clots of mucus, epithelial masses, or crystals. As a rule, blood is an indication of ulceration if it is found mixed with the intestinal discharges. Pus is usually disseminated among the other contents of the bowel, and its presence unmixed with the fæcal matters is an indication of its origin in the

lower part of the large intestine. Ulceration is accompanied by constipation as often as it is by diarrhœa.

Speaking generally, the part of the intestine affected by enteritis may be reached by remedies given by the mouth or by the rectum. The colon alone is capable of being affected by substances introduced into the rectum and is often thus modified in a very remarkable way. This is one reason for considering apart the treatment of dysentery and of dysenteric diseases. In the chapter on intestinal antisepsis we have already given directions which are especially applicable to direct antisepsis of the large intestine.

Acute Enteritis.—The cause of the affection (cold, excess in eating, improper food, or the ingestion of irritating substances of various kinds) will furnish a most valuable therapeutic and prophylactic indication. The treatment of acute enteritis may be divided into two stages. We should first give a saline purge and then opium, subnitrate of bismuth, prepared chalk, and sometimes antiseptics, such as salol, salicylate of bismuth, and preferably again benzonaphthol. In very severe cases absolute rest must be enjoined. For the relief of intestinal pain we may apply poultices containing laudanum and give opiates internally. The diet should consist wholly of milk at first, but later boiled eggs and a moderate amount of food, containing but little indigestible residue, may be allowed. The necessary precautions against relapses, which occur so readily, should be taken.

Chronic Enteritis.[1]—In the sections on diarrhœa, constipation, and intestinal antisepsis we have already indicated the therapeutical measures to be employed in chronic enteritis; the treatment will vary according as diarrhœa or constipation is the predominating condition; intestinal antisepsis is called for especially in cases of habitual diarrhœa or when diarrhœal attacks complicate chronic constipation. For the special treatment of the enteritis itself a course at some purgative spa is often advised. The diet

[1] See the treatment of muco-membranous colitis in Chapter V., Part III.

is to be regulated upon the principles which we have already explained.

In chronic ulcerative enteritis, of which tubercular enteritis is the type in our climate, diet holds the first place. When diarrhœa is present we must have recourse to a milk diet, raw meat, or food powders. Nitrate of silver in pill form, in doses of ¾ to 1½ grains a day, has been recommended for the cure of the ulcers, but it is very difficult to understand how the remedy can promote cicatrization when it is impossible for it to reach the seat of the lesions in its natural state; nevertheless good results have occasionally been found to follow its administration. When the symptoms point to the colon as the location of the trouble we may employ astringent enemata and lavage of the large intestine.

In tropical regions chronic diarrhœa assumes an intensity which is hardly ever seen in northern countries. Observers do not agree as to the nature of the diarrhœa met with in the extreme East (Cochin China). Some regard it as essentially a dysentery, while others believe that it is a distinct affection caused by a special organism. For others again it is the common result of all the numerous and active causes of diarrhœa in warm countries. One common element in the causation is malarial infection. We may say here that chronic diarrhœa of malarial origin is by no means uncommon, and that in individuals suffering from paludic infection we often see a diarrhœa of long standing yield to quinine when it has resisted all other forms of treatment.

In cases of diarrhœa of warm countries and similar affections in our own climate we should prescribe an absolute milk diet, opium at the beginning and later benzonaphthol, salicylate of bismuth, salol, lactic acid, and astringent or antiseptic enemata, the formulæ for which we have previously given. Convalescents should be watched with particular care as regards both diet and hygiene, because of the great tendency to relapse.

CHAPTER V.

DYSENTERY.

DYSENTERY is an infectious and contagious disease, often occurring as an epidemic, common and severe in hot climates, and of which the lesions are located in the large intestine, especially in its lower part. The symptoms of the various acute forms may differ greatly from each other; the disease my become chronic.

Very many modes of treatment have been employed, some of which have produced results so favorable that they have become in a measure standard; these are the ones which we shall discuss in the present chapter. The treatment is based upon certain principles of which we ought not to lose sight. We must not forget, for example, that the diarrhœa is only apparent, and that in reality constipation is present in dysentery; the profuse discharges are composed of the secretions from the inflamed or ulcerated mucous membrane; true fæcal stools are absent or are represented only by a few scattered, hard, broken masses. It is, therefore, a great mistake to treat dysentery as one would a diarrhœa and attack it with opiates, subnitrate of bismuth, or astringents administered by the mouth.

Purgatives are the remedies indicated in dysentery, especially, it would seem, cholagogue purgatives,[1] for it has been remarked that dysenteric stools contain no bile and that the return of this secretion is of excellent augury. Purgatives of the most various kinds have been vaunted, such as tamarinds, manna, cream of tartar, alkaline salts, Rochelle salt (potassium sodium tartrate), and rhubarb. But all these are inferior to calomel, which may be given

[1] Dujardin-Beaumetz: "Leçons de Clinique Thérapeutique," "Traitement des Maladies de l'Intestin," p. 659, 1880.

in a single large dose of 6 to 15 grains or in ten divided doses of ½ grain each.

Ipecac is, however, the remedy which has been most highly recommended in the treatment of dysentery. It may be given by what is called the Brazilian method. An infusion is made of 2 drachms of pounded ipecac root in 6 ounces of water; this is filtered and taken in tablespoonful doses during the first day. The following day the same ipecac is again infused in an equal amount of water and administered in the same way. The third day the ipecac which has already served twice before is once more infused in 6 ounces of boiling water; but this time the whole, ipecac and infusion, is taken during the course of the day. Delioux de Salignac has sought to simplify this method of administration in the following way: One drachm of powdered ipecac is boiled for five minutes in 9 ounces of water; this is filtered and to it are added 1 ounce each of syrup of opium and cinnamon water. Of this mixture a tablespoonful is taken every hour. Segond combines ipecac and calomel in the following pills, which are much employed by naval surgeons:

℞ Powdered ipecac, ... gr. xij.
Calomel, ... gr. vi.
Extract of opium, ... gr. iss.
Syrup of buckthorn, ... q. s.
M. et ft. pil. no. xii.

The root of ailanthus glandulosa has been recommended as a substitute for ipecac (Robert). In the way of local treatment astringent and antiseptic enemata of all kinds have been used; among these are rhatany, solution of the subacetate of lead (1 drachm to 8 ounces of water), nitrate of silver (3 to 7 grains to 6 ounces of water), iodine (tincture of iodine, 2½ to 5 drachms, iodide of potassium, 8 to 15 grains, and 8 ounces of water), boric acid (1 per cent), permanganate of potassium (0.2 per cent), and corrosive sublimate. Delioux de Salignac gives the following by enema: the white of an egg is dissolved in 6 ounces of water and to it are added 7 grains of nitrate of silver and

then an equal amount of chloride of sodium in solution. Bonamy gives from a grain to a grain and a half of sublimate in eight ounces of water to which a little alcohol is added; this is used morning and night.[1] Naphtholated water may also be used by enema. In chronic cases we may employ benzonaphthol.

A milk diet is absolutely indicated during the treatment of dysentery.

[1] Although no accident has been reported, we should fear to use injections containing such a large quantity of corrosive sublimate.

CHAPTER VI.

TYPHLITIS, PERITYPHLITIS, APPENDICITIS.

UP to within a recent period physicians have held to the theory of stercoral engorgement in the production of typhlitis; according to this the accumulation and induration of fæcal matters in the cul-de-sac of the cæcum cause distention and resultant inflammation. In proportion to the intensity of this inflammation and the individual susceptibility of the peritoneum there arise symptoms of stercoral typhlitis with cæcal engorgement, perforation with limited peritonitis, iliac phlegmon, and occasionally generalized peritonitis. These views are no longer held, and to-day it is even a question whether stercoral typhlitis exists. Laparatomy has been performed in the early stages of supposed cases of typhilitis, and instead of a fæcal accumulation in the inflamed cæcum the operators have found inflammation and frequently perforation of the vermiform appendix.[1]

The cæcum may certainly be inflamed independently, and it is possible that a collection of fæcal matter may provoke or increase this inflammation, but there is no proof that the collection of symptoms to which the name of stercoral typhlitis had been given really corresponds to inflammation of the cæcum secondary to an accumulation of scybala in its cavity. The place of the cæcum has been taken by its appendix, and it is to inflammation and perforation of the appendix that we must attribute the phenomena formerly ascribed to disease of the cæcum. Quite

[1] Maurin: "Essai sur l'Appendiculite," Thèse de Paris, 1891; Talamon: "Appendicite et Périty phlite," Bibliothèque Charcot-Debove, 1892.

frequently the inflammation is caused by the penetration of a foreign body, a little ball of fæcal matter, into the cavity of the appendix. This foreign body may be the cause of quite violent pain due to the contractions of the appendix in its efforts to press back the fæcal plug into the cæcum whence it came; this is what Talamon has called appendicular colic. The irritation arising from the presence of the fæcal matter may determine a simple limited inflammation of the walls of the appendix, a spontaneous cure of which is possible; this is called parietal appendicitis. In other cases the inflammation may be much more intense; pus forms in the dilated appendix, the walls of the latter ulcerate, and perforation ensues. This perforative appendicitis may result in a circumscribed, possibly suppurative, peritonitis or in a hyperacute generalized inflammation of the peritoneum.

Medical treatment was formerly the only one employed, and it was not until late in the course of the disease that surgical intervention was practised to give exit to purulent collections. At the beginning of the trouble, as soon as pain was felt in the iliac fossa, purgatives and antiphlogistics were given. Occasionally the purgatives employed were too energetic and only added to the dangers of perforation and peritonitis. In addition to the exhibition of cathartics and enemata leeches and cataplasms were applied. In most cases treated in this way recovery ensued; but it cannot be doubted that many have been thereby pushed to a fatal issue which at the present day would be saved by surgical intervention or by a more rational medical treatment in which purgation holds a less conspicuous place. It is a question with some whether medical treatment is proper in any case, and many agree with Keen that the first indication in a case of appendicitis is to call the surgeon. Others, among them Talamon, regard this doctrine as extreme and maintain that it is not logical to undertake a surgical operation which is still dangerous, notwithstanding the progress made in antiseptic methods, for the treatment of an affection which usually recovers

spontaneously. An operation is not necessary in cases of appendicular colic or of parietal appendicitis.

It is not certain that such a thing as appendicular colic really exists, yet it is very possible. It is comparable in its mechanism as well as in its symptomatology to hepatic colic; following over-fatigue or exposure to cold, there is a severe pain appearing suddenly in the iliac fossa and unaccompanied by fever or any well-defined local phenomena; there is no tumor in the cæcal region. The treatment of this condition should be conducted on the same plan as that of hepatic or of renal colic: hypodermic injections of morphine, poultices, warm baths, mild purgation, and rest in bed.

In parietal appendicitis the condition is more serious; the pain at the outset is persistent and subject to exacerbations, and sometimes there is a circumscribed swelling in the right iliac fossa; there may also be a slight elevation of temperature (101° to 102° F.). Medical treatment is permissible in this stage; it should consist in absolute rest in bed, the application of ten or twelve leeches to the iliac fossa, cold applications or poultices, and mild catharsis by teaspoonful doses of castor oil taken every hour till the desired effect is obtained. But before resorting to these simple measures which often result in a cure, we must be certain that the inflammation is limited in extent and that there is neither suppuration nor perforation.

Laparatomy is indicated in hyperacute cases and when there are symptoms of generalized peritonitis. When the inflammation remains circumscribed and the purulent collection is encysted it is well to delay operative interference for a few days. Trèves says that we ought not to operate before the fifth day and Talamon holds that there is more safety in delaying for from eight to twelve days, a conclusion which he has drawn from the study of numerous statistics. The advantage of delay would be to give time to the inflammation to limit itself and to save from operation those cases which would recover under medical treatment. In a recent discussion before a Swiss medical

society[1] the almost unanimous expression was had that medical treatment should be preferred to surgical (Kocher, Huguenin, Wyss, Sahli). Absolute rest in bed and opiates should be the basis of treatment; purgatives are contra-indicated because immobilization of the intestine is sought for. But surgical intervention is called for whenever pus is present.

It is needless to say that many surgeons favor methodical and early intervention, but, in the early stages we incline to the side of medical treatment, while admitting, of course, the utility and necessity of laparatomy in cases of perforation or suppuration.

The aim of operative interference is:

1. In case of perforation to cleanse the peritoneum from the intestinal contents which have escaped into its cavity and thus to prevent the occurrence of general peritonitis.

2. In case of suppuration to evacuate the pus and to cleanse the cavity in which it had collected.

3. In all cases to remove the affected appendix and thereby prevent relapses.

Certain surgeons favor operation whenever it is certain that the appendix is diseased and threatened by suppurative inflammation. Talamon, as we have seen, raises strong objections against this view. It is allowable in cases of recurrent appendicitis to resect the appendix in the interval between two attacks in order to put an end to the series of inflammatory crises with their constant menace of perforation and of peritonitis or abscess.

Since habitual constipation certainly plays an important rôle in the etiology of appendicitis, we ought always to treat this condition in order to prevent relapses.

We have thus far spoken only of primary appendicitis, but we occasionally see cases of true secondary typhlitis, unaccompanied by any clear signs of appendicitis. For example, during the course of a typhoid fever, we occasionally observe that the pain in the iliac fossa becomes more intense than usual and that there is a swelling in

[1] Correspondenzblatt für Schweizer Aerzte, No. 4, 1893.

this region; this inflammation may resolve under the influence of rest and of emollient application, but it may result in the formation of a peri-cæcal abscess. Tubercular typhlitis, although rare, is occasionally encountered.

In conclusion we may say that it has been shown at autopsy that the cæcum may become dilated, acquiring sometimes very considerable dimensions. It is evident that fæcal masses might accumulate in this cavity and aid in exciting an inflammation there analogous to muco-membranous colitis. The treatment suitable for the latter condition would be indicated in these cases.

CHAPTER VII.

INTESTINAL OCCLUSION.

THE causes of intestinal occlusion are very numerous. We may distinguish:[1]

1. Causes acting externally to the intestine, such as strangulation by false ligaments, by rents or openings in the omentum or mesentery, or by diverticula, such as an elongated vermiform appendix; internal hernias, or compression from tumors of various kinds.

2. Strangulation of the intestine by torsion, knots, or sharp bends.

3. Obstruction of the lumen of the intestine by biliary or intestinal calculi, by foreign bodies, or by fæcal accumulations.

4. Obstruction of the intestine by itself—acute or chronic invagination and intussusception.

5. Occlusion by lesions of the intestinal walls—cicatricial or cancerous stenosis.

Sometimes the phenomena of intestinal occlusion arise without any appreciable material cause in consequence of a sort of paralysis of the wall of the gut—pseudo-strangulation.

One may see from this enumeration of the causes of intestinal occlusion that certain cases may be amenable to medical treatment, while others are not. Medical treatment may effect a cure when there is mechanical obstruction, resulting from the presence of fæcal masses or of calculi in the intestine; the exhausted peristalsis may be aroused in such a way as to cause the expulsion of the obstructing body and thus re-establish the permeability of the intestine. It may, by simply stimulating the intes-

[1] Courtois-Suffit: "Traité de Médecine," vol. iii., p. 527.

tinal movements, straighten out a bend or even a slight torsion and disengage an invaginated loop when the condition has not gone too far and when adhesive inflammation of the peritoneum has not glued together too strongly the folds of the bowel. When there is a slight degree of stenosis, the obstruction may be caused by a fæcal plug, the dislodgement of which may possibly be effected by more active peristalsis. The most striking results of medical treatment are seen in cases of obstruction due to weakness of the intestinal walls. It is absolutely useless when opposite conditions prevail, when the intestine is utterly exhausted or the obstacle is of such a nature as to be irremovable. It is in these cases that surgical intervention is indicated.

Physicians should keep the principle constantly in mind that, while acting with sufficient energy, they must avoid wearing out the intestine by excessive stimulation and allowing the organism to become exhausted by pain, vomiting, or auto-intoxication. They should be ready to resort to surgical measures at a sufficiently early period while the patient's powers of resistance are still unexhausted and the lesion of the intestine and of its peritoneal coat is yet moderate in extent and degree. They should none the less insist upon a trial of medical methods whenever they find themselves in the presence of one of the conditions which we have indicated as favorable. It is proper to remark that it is often very difficult to arrive at an exact diagnosis of the nature, degree, and sometimes even of the seat of the lesions. The location of the lesion is a matter of great importance, for, in a general way, we may say that measures bearing directly upon the large intestine (copious enemata, insufflations, etc.) will hardly succeed except when the colon is the seat of the occlusion.

We cannot devote much space to the question of diagnosis, although we may recall a few of the important principles. Invagination is much more frequent in children, while obstruction and cancer are common in the aged. The earlier vomiting occurs and the more frequent it is

the higher up in the intestine is the occlusion. The bowels may move even after occlusion has occurred, but then only when it is located in the upper portion of the intestine. Bloody stools and rectal tenesmus are symptoms especially of invagination. The absolute suppression of the emission of gas has a much greater significance in the diagnosis of occlusion than has the persistence of the stools. Stercoraceous vomiting is symptomatic, though not pathognomonic, of intestinal occlusion. When the occlusion has its seat in the small intestine the tympanites occupies the middle portion of the abdomen chiefly, but is located more in the peripheral parts when the lumen of the large intestine is closed.

The medical measures to be adopted in cases of occlusion of the intestine are purgatives, rectal injections, either liquid or gaseous, and the external application of electricity. Morphine, given for the relief of pain, is sometimes useful also as a direct remedy for the occlusion. Massage is very dangerous in these conditions. Capillary puncture of the intestine distended with gas is easy of accomplishment, but it can hardly serve as anything more than a palliative measure to be employed when the tympanism is extreme.

The purgatives used should not be too energetic in their action. Extreme catharsis often does more harm than good, as it causes severe pain, vomiting, predisposes to peritoneal inflammation, and may even cause a sudden rupture of the intestine. Castor oil is the laxative of choice in this condition; it is particularly indicated when there is reason to believe that the obstruction is due to fæcal accumulations in the cæcum or colon, in the aged especially. It may be given in one large dose of five to eight drachms in black coffee, or in teaspoonful doses repeated until the desired effect is produced. The oil may thus be given when the symptoms of obstruction are not very intense and when there is no vomiting. The saline purgatives may also be employed, but they are inferior to castor oil. Under no pretext should the physician resort to the

use of drastic purgatives, even in small dose. If castor oil has proved ineffectual or if vomiting is so profuse that the oil will not be retained, we must resort to purgative enemeta or to high rectal injections. About an ounce of sulphate of soda may be added to the injection to produce a more intense action or we may use a decoction of two to five drachms of senna leaves with the addition of five or six drachms of sulphate of soda. Enteroclysis may be performed in the way which we have described above; as large an amount as possible of liquid is to be injected, but extreme gentleness should be observed. For this reason we should avoid all effervescent mixtures and gaseous insufflations, which if they are not energetic are inefficacious, and if they are made with force may be dangerous. A good result has often been obtained by the injection of seltzer water, the nozzle of a siphon being connected with a rubber tube attached to a rectal sound. Care should be taken to make the injection slowly and very gently.

In a general way we are opposed to external manipulations; we may make cold applications, especially ice-bags, but this is a very secondary measure from which we cannot expect much in the way of results.

After having tried castor oil and rectal injections we may resort to electricity, which has sometimes produced good results; it may be given in the form of an electrical enema, which Boudet describes as follows: a galvanic current is employed and is applied by means of a special electrode consisting of a rubber sound inclosing a metallic stylet which does not reach quite to the extremity of the tube, so that it never comes in direct contact with the mucous membrane. The negative current is made to pass through this stylet while the positive electrode is applied to the abdomen. The strength of the current should not exceed 10 to 15 milliampères, and each séance should last about twenty minutes, care being taken to interrupt the current from time to time. The current passing through the stylet reaches the rectum through the liquid which has been previously injected. The positive electrode consists

of a cake of clay or of a metallic plate covered with chamois moistened with salt water, and is applied to the lumbar or epigastric region. Induced currents have sometimes been used, but they are certainly less serviceable than the continuous current. This electrical enema is the best medical measure for overcoming intestinal occlusion; it is often successful, and it possesses the advantages of at least being harmless, rapid in its action, not exhausting to the patient and not endangering the intestine. Even if a successful result is not obtained, the patient is still in good condition for surgical intervention.

We cannot repeat too often that the medical attendant should take care not to use too violent means for overcoming the occlusion. We have several times seen patients who had taken large quantities of purgatives and numerous injections, and who were suffering from incessant vomiting, atrocious pain, and marked tympanites, recover without operation as a result of absolute rest, a few injections of morphine, and applications of ice to the abdomen.

It is true that morphine will not cure every case of intestinal occlusion, but it is not improbable that in certain cases there are excessive antiperistaltic movements which interfere with the normal progression of the intestinal content and cause stercoraceous vomiting, and even after the cause of the occlusion had been removed these symptoms might persist as a result of the antiperistalsis which morphine would subdue. We may, then, always give one or two injections of morphine if the vomiting and pain persist after the administration of purgatives and enemas. In any event this will give the patient a moment of relief and may even lead to recovery. It will allow us to employ, with the greatest chances of success, electrical enemata, and, if this fails, to resort to laparatomy, the *ultima ratio* of modern therapeutics.

In case of excessive vomiting and of threatening exhaustion, we may employ hypodermic injections of artificial serum, to which we may add some phosphate of soda by reason of the tonic properties and of the stimulating action

upon the nervous system which have been attributed to hypodermic injections of this salt (Crocq fils, Huchard).

It is well to remember also that lavage of the stomach has often given good results in intestinal occlusion; it at least insures a short period of precious repose. Its good effects are probably due to the removal of toxines which have accumulated in the stomach.

CHAPTER VIII.

CANCER OF THE INTESTINE.

THE treatment of cancer of the intestine is wholly palliative, nevertheless medical treatment may render valuable service in many cases. The physician may overcome the pain and may, by measures of hygiene and of intestinal antisepsis, prolong the patient's life.

A milk diet answers the best in cases of intestinal carcinoma, but it may be modified by the addition of eggs, purées, and occasionally of minced meat and food powders. Generally speaking, we should give food containing little indigestible matter, which is not liable to undergo fermentation and putrefaction.

We may prevent stagnation of the intestinal contents by means of castor oil or saline purgatives. This obstruction is often favored by stenosis of the intestine, which may even end in complete occlusion. When the lesion is situated in the lower portion of the large intestine we may occasionally re-establish the passage by catheterization by means of a rubber sound, or by enteroclysis. We should never forget that the utmost gentleness should be employed in these manœuvres.

Intestinal antisepsis will also be useful, as it reduces in a measure the evil results of auto-intoxication; benzonaphthol is the antiseptic to be preferred. In favorable cases, when the lesion involves the colon, which is its most frequent seat, antiseptic lavage of the large intestine may be done with advantage.

The pain should be combated by hot poultices, opiates by enema, or hypodermic injections of morphine.

Surgical intervention is to be thought of only in the earliest stages, at a time, unfortunately, when the diagno-

sis is seldom certain. Later we can do no more than re-establish the flow of the intestinal contents and thus prevent occlusion from putting a comparatively early termination to the disease. It might be possible, in certain cases, to perform an intestinal anastomosis around the lesion, but, as a rule, in cancer of the lower part of the colon we must content ourselves with the establishment of an artificial anus.

CHAPTER IX.

INTESTINAL PARASITES.

We shall consider in this chapter the treatment of tape-worm, ankylostoma duodenale, lumbricoids, and thread-worms.

Tœnia.—The most common varieties are tænia solium, tænia medio-canellata, and the bothriocephalus. The other varieties of tape-worm are seldom met with, at least in northern regions. The treatment is the same, whatever kind we have to deal with. The medio-canellata is becoming more frequent than the solium; the bothriocephalus is rather common in countries where large quantities of fish, especially salmon, are consumed, such as Switzerland, northern Italy, and Sweden. The frequency of other forms of tape-worm is in relation especially with the consumption of raw or insufficiently cooked beef. As a measure of prophylaxis we should always eat beef well cooked, and when it is desired to give raw meat as a therapeutic agent we should make use of mutton or horse-flesh. These animals are believed to be exempt from invasions of tænia.

There are a certain number of general principles which should always be borne in mind in the treatment of tape-worm. In the first place we ought never to prescribe a tæniafuge medication until we are certain that the worm is sufficiently developed to make its entire expulsion, head and all, possible. Physicians are often pestered by nosomaniacs who believe they have a tape-worm and want to receive treatment with a view to its expulsion. Others really have a tænia and have received regular treatment for it; but either the head has been expelled and the patient simply imagines that the parasite is still present in his bowel, or the head remains but it is not yet time for

the recommencement of measures looking to the destruction of the worm. A physician should never prescribe for tape-worm unless he has seen some of the segments. He should never commence another course of tæniafuge treatment until the segments of tænia medio-canellata[1] appear again in the stools or until three or four months have elapsed since the expulsion of a solium minus its head.

Another principle is to avoid too severe a fast as a preparatory measure. It was formerly the custom to subject the patient to absolute abstention from food, or at most to allow him a little milk, the day before the tæniafuge was to be taken. There is a danger in pushing this too far, for the condition of emptiness would favor the absorption of the poisonous substances contained in the remedies given.

The expulsion of a tape-worm is accomplished in two stages: first, the administration of the medicinal substance destined to render the parasite torpid, to make it incapable of clinging to the intestinal wall; and secondly, the administration of a purgative in order to effect the expulsion of the benumbed worm. Too long a period ought not to be allowed to elapse between the administration of the tæniafuge and that of the purgative.

As it is very necessary to know whether the head has been expelled or not, the patient should go to stool on a vessel filled with tepid water. The head appears as a slight swelling at the end of the very slender portion which forms the neck. The search for it, which is a very delicate matter, is much facilitated by this precaution; furthermore, the worm is held suspended in the water and does not break.

Of the remedies which are most efficacious for the expulsion of a tape-worm we shall study male fern, pomegranate bark and the alkaloids derived from it, kousso,

[1] Clinically the presence of tænia medio-canellata is recognized by the fact that the segments are passed spontaneously in small quantities. The patients find these segments almost daily in their stools, or even, when defecation has not taken place, in their clothes.

Corsican moss, and pumpkin seeds; in this list we have ranged the substances according to their therapeutic value, except that for the first place there might be a contention between male fern and pomegranate bark or rather the salts of pelletierine discovered by Tanret. The latter are preferred by Bérenger-Féraud[1] and Dujardin-Beaumetz. Their toxic action is, however, so marked and the results obtained by the ethereal extract of male fern, when administered according to Créquy's formula, are so favorable that we prefer male fern to pomegranate. Kousso (brayera) has been practically given up on account of its very disagreeable taste, and it is, moreover, much less active than the first two named. Corsican moss and pumpkin seeds are hardly suitable except for children; they have the very great advantage of being non-poisonous.

Male Fern.—The fresh rhizome is used. The simple powder may be employed; this formed the basis of the formula sold by Mme. Müffler to Louis XVI: "Six grammes of powder of male fern in 125 to 180 grammes of water, to be taken at one dose in the morning fasting; about an hour afterward a purgative, such as calomel and pulverized scammony, each 0.60 gramme, and gamboge, 0.30" (Soulier). Paschier, of Geneva, was the first to make an ethereal extract of male fern; he made pills of it mixed with calomel, but the powders prescribed by Créquy are to be preferred. These consist each of ¾ grain of calomel and 7½ grains of the ethereal extract of male fern. The following is Créquy's mode of administration:

1. The evening before, the patient takes no food but milk. 2. In the morning before breakfast from twelve to sixteen of the above powders inclosed in capsules are taken at intervals of five minutes. 3. If the expulsion of the worm has not been effected at the end of two or three hours, the patient takes from 2 to 3 ounces of syrup of ether, and after that from 1½ to 2 ounces of castor oil. This method, which gives excellent results, is the one we prefer. It is, however, rather fatiguing and should not be employed

[1] "Leçons Cliniques sur les Tænias de l'Homme," Paris, 1888.

uselessly. We have seen some patients, doubtless already predisposed, become markedly neurasthenic after having followed the treatment here described. It is well to know also that the ethereal extract of male fern possesses poisonous properties, due, some believe, to the presence of filicic acid. The dose of 2½ to 5 drachms of the extract ought never to be exceeded.[1] As filicic acid is soluble in oil, we should not employ castor oil as a purgative in combination with the male fern treatment.

The *bark of pomegranate root* has often been employed in decoction, and this is not a bad preparation. It is made in the proportion of 2 ounces of the fresh bark of pomegranate root to 24 ounces of water. The bark is broken into small pieces, boiling water is poured over it, and it is left to macerate for twenty-four hours; it is then reduced by evaporation to 16 ounces and filtered.

Soulier adds 2½ ounces of the contused bark to a glassful of boiling water; this is evaporated one-half over a slow fire and filtered; another glassful of boiling water is added to the bark remaining in the filter, evaporated down one-half, filtered, and added to that previously obtained.

Tanret has extracted four alkaloids from pomegranate bark, which he calls pelletierine α, β, γ, δ. Bérenger-Féraud has shown that the last named two have no tæniafuge properties. The two other alkaloids may be employed alone or in combination. The following is the method which Dujardin-Beaumetz employs in the administration of these alkaloids:[2] the evening previous the patient is given a copious enema, and takes nothing in the way of food except milk; in the morning while fasting he takes 4½ grains of sulphate of pelletierine in a solution containing 7½ grains of tannin, ten minutes later a large glass of water, and then at the end of three-quarters of an hour 1 ounce of compound tincture of jalap,[3] or better from 8 to

[1] Lépine: "Semaine Médicale," p. 237, 1891.

[2] De Rochemure: Thèse de Paris, 1879.

[3] Compound tincture of jalap (*eau-de-vie allemande*) is composed of jalap, 80 parts; turpeth root, 10; scammony 20, and 60-per-cent

12 drachms of castor oil; the patient should be instructed to pass his stools in a vessel of tepid water. Bérenger-Féraud prefers infusion of senna as a purgative. But whatever the drug employed as a purge it should be given three-quarters of an hour after the pelletierine.

Kousso (brayera) is the female inflorescence of an Abyssinian tree of the order of *rosacea*. The powder of the flowers is given in doses of ½ to 1 ounce added to boiling water; the water is allowed to cool and the whole is taken without straining. This infusion has a bad taste and often excites vomiting, which hinders the success of the treatment, Bérenger-Féraud having had only twelve successful cases out of one hundred in which the remedy was used.

Pumpkin seeds have given only five per cent of successful cases in the practice of the author just mentioned, but for all this the remedy is often useful in the case of children and should not, therefore, be wholly abandoned. To adults 2 ounces of the hulled and pounded seeds may be given mixed with an equal quantity of sugar or jam. An ounce of castor oil is to be taken one hour afterward. It has been recommended that a handful of the cleaned and pounded seeds be eaten with sugar every day for a week, at the end of which time a dose of castor oil is taken. A. Dumas[1] reports the case of a patient who passed a tape-worm, that had been rebellious to all treatment, after having taken such a mixture every morning for two months.

Corsican moss is a mixture of various marine plants; it is given in doses of 1 to 5 drachms in boiling milk. It is also employed as a vermifuge; the following is suitable for a child two years old (Bouchardat): steep 75 grains of Corsican moss in 3 ounces of boiling milk, strain and add

alcohol, 960 parts. The dose here given of 1 ounce (30 grammes) is greater than we should venture to advise. Dujardin-Beaumetz, however, thinks that the action of the tannin and of the pelletierine tends to diminish that of the compound tincture of jalap so that there will be no undue purgation from this dose.

[1] Journal de Thérapeutique, 1877.

5 drachms of sugar. This is to be taken in the morning fasting.

Ascarides Lumbricoides.—The principal vermifuge for these parasites is Levant worm-seed and its active principle santonin. The dose of Levant worm-seed is 15 to 90 grains in honey, jam, or wafers. The dose of santonin is 1 to 3 grains. We must not forget that the latter is a toxic substance which has been known to produce eclampsia in an infant of five months when given in a dose of less than half a grain (Binz). We must not forget also that it has a cumulative effect, and as we desire to avoid its absorption the patient should not be fasting too strictly when it is taken. Its administration should be followed by a dose of some purgative, preferably castor oil.

Oxyures Vermiculares.—These little worms inhabit exclusively the lower portion of the rectum and the anus, though occasionally in young girls they are found in the vagina. Vermifuge remedies taken by the mouth have no sort of effect upon them, and consequently we must treat them exclusively by local measures. One of the most simple methods of treatment consists in the use of cold-water enemata repeated several times a day; a boric acid solution may also be employed in the same way. Dujardin-Beaumetz praises highly injections of equal parts of glycerin and water. In the case of young children who sometimes resist the giving of an enema we may insert little suppositories of mercurial ointment or a few threads of cotton or linen impregnated with the same substance.

Ankylostoma Duodenale.—This parasite, discovered by Dubini, is very common in upper Italy and in Egypt. The famous epidemic of anæmia occurring among the workmen on the St. Gothard tunnel was attributed to the presence of this worm. It is about half an inch in length, and inhabits the duodenum, where it attaches itself to the mucous membrane and sucks the blood, thereby provoking numerous little hemorrhages which lead finally to an extreme degree of anæmia. It lives in the water of pools drunk by navvies and brick-makers; and these workmen

should therefore be counselled to drink only boiled or filtered water and to wash their hands most carefully before eating. The ethereal extract of male fern is said to be the best anthelmintic remedy for this formidable parasite.

Besides these parasites a number of protozoa are found, the rôle of which in the production of intestinal disease is as yet unknown. Attention has hitherto been directed altogether to a study of the bacilli in the bowel, but it would be well to devote investigations to these protozoa, which may in certain cases have a most important pathogenic influence.

APPENDIX.[1]

Hyperchlorhydria and Round Ulcer.

℞ Bicarbonate of soda, ... ʒ iij.
Prepared chalk, ... ʒ i.
M. bene et ft. chart. no. xx. Sig. 15 or 20 powders a day. (Debove.) In case of constipation the prepared chalk may be replaced by magnesia.

℞ Calcined magnesia,
Prepared chalk, ... āā ʒ i.
Bicarbonate of soda, ... ʒ v.
M. et ft. chart. no. xx. Sig. One powder every half-hour for three hours following a meal. (Debove.)

This powder is equal in its antacid effect to 38 grains of bicarbonate of soda. Calcined magnesia has a saturating action equal to four times its weight of bicarbonate of soda, and ammonio-magnesian phosphate to twice its weight of this salt.

Stimulating Medication.

℞ Tincture of ipecac,
Tincture of calumba,
Tincture of gentian, ... āā ℥ ss.
M. Sig. 20 to 30 drops, repeated in one-half to one hour, after eating. (A. Mathieu.)

℞ Tincture of ipecac,
Tincture of gentian,
Tincture of nux vomica, ... āā ℥ ss.
M. Sig. 10 or 15 drops, repeated in an hour, after eating. (A. Mathieu.)

[1] We reproduce here most of the formulæ given in the text, adding some which have been recently proposed, without, however, guaranteeing their efficacy.

℞ Sulphate of strychnine, ... gr. i.
Distilled water, ... ʒvi.
M. Sig. A teaspoonful with each of the three meals. (Grasset.)

Vigier's mixture:

℞ Bitter drops of Baumé,[1] . . . . . ♏xlv.
Tincture of bitter orange-peel,
Tincture of star-anise, ... āā ʒ iss.
Tincture of calumba,
Tincture of cinchona, ... āā ʒ iiss.
Peppermint water, ... ℥ss.
Orange-flower water, ... ℥i.
Distilled water, ... ℥vij.
M. et filtra. Sig. 1 or 2 tablespoonfuls before eating.

℞ Hydrochloric acid, ... gtt. xv.
Fluid extract of condurango, ... gtt. xxx.
Syrup of bitter orange-peel, ... ℥v.
M. Sig. A tablespoonful after each meal. (Barié.)

℞ Chloroform, ... gtt. xxv.
Tincture of bitter orange-peel, ... gtt. xl.
Tincture of gentian,
Tincture of star-anise,
Tincture of nux vomica, ... āā ʒ i.
M. et filtra. Sig. 10 or 20 drops in water fifteen minutes before each meal. (Huchard.)

Gastric Atony with Constipation.

℞ Tincture of nux vomica,
Tincture of gentian, ... āā ʒ ss.
Tincture of orange-peel, ... ʒ iiss.
Fluid extract of cascara sagrada, ... ℥iss.
Syrup of orange-peel, ... ℥ij.
M. Sig. A teaspoonful before each meal. (Barié.)

℞ Tincture of nux vomica, ... ʒ i.
Tincture of rhubarb, ... ʒ iss.
Tincture of gentian,
Tincture of calumba,
Tincture of cinchona, ... āā ʒ iiss.
M. et filtra. Sig. 15 to 20 drops before the two principal meals.

[1] One part of soot, 5 parts of carbonate of potash, and 500 parts of grated St. Ignatius bean are macerated for ten days in a closed vessel in 1,000 parts of alcohol; the mixture is then expressed and filtered.

Acid Medication.

℞ Pure fuming hydrochloric acid, ... ʒ i.
Distilled water, ... Oij.
M. Sig. 1 or more wineglassfuls in divided doses after eating. (Bouchard.)

℞ Hydrochloric acid, ... ʒ ss.
Distilled water, ... ℥ vi.
M. Sig. A tablespoonful in a quarter of a glass of sweetened water two or three times a day after eating. (Hayem.)

℞ Old "Rabelized" sulpho-nitric acid,[1] . . . ʒ x.
Distilled water, ... Oi.
M. Sig. 1 or 2 tablespoonfuls after eating. (Coutaret.)

Pepsinogenous Medication.

℞ Dextrin, ... ʒ ij.
Rum, ... ʒ iv.
Simple syrup, ... ʒ xiv.
Water, ... ℥ iv.
M. et ft. elixir. (Dujardin-Beaumetz.)

Gastro-Intestinal Antisepsis.

Solutions for lavage of the stomach:

Borax, ... ʒ iiss. : Oi.
Creolin, ... gr. iv.–viij. : Oi.
Salicylic acid, ... gr. xviij. : Oi.
Thymol, ... gr. iv. : Oi.
— (Rosenheim.)

[1] The following is the formula for this *acide sulfonitrique rabelisé:*

℞ Chemically pure sulphuric acid, . . 28 parts.
Nitric acid, ... 8 "
Alcohol (60%), ... 180 "

The acids are added very slowly to the alcohol in a vessel surrounded by ice, and the mixture is left in an unstoppered flask for two weeks; then the flask is closed and the preparation is allowed to ripen for ten months before being used. It contains sulphonitric acid and a small quantity of nitric ether.

℞ Beta-naphthol, ... ʒ iv.
Salicylate of bismuth, ... ʒ ij.
M. et div. in chart. no. xxx. Sig. From 8 to 12 powders in the twenty-four hours. (Bouchard.)

Benzonaphthol may be given in powders of 7½ grains each, repeated eight or ten times a day.

℞ Salicylate of bismuth,
Henry's magnesia,
Bicarbonate of soda, ... āā ʒ iiss.
M. et div. in chart. no. xxx. Sig. 1 powder at each of the principal meals. (Dujardin-Beaumetz.)

℞ Beta-naphthol,
Salicylate of bismuth,
Bicarbonate of soda, ... āā ʒ iiss.
M. et div. in chart. no. xxx. Sig. 1 powder at each of the principal meals. (Dujardin-Beaumetz.)

℞ Salol,
Salicylate of bismuth, ... āā ℥ ss.
M. et div. in chart. no. xxx. Sig. 1 powder at each of the principal meals. (Dujardin-Beaumetz.)

℞ Salicylate of bismuth,
Alpha-naphthol,
Charcoal, ... āā ʒ iiss.
M. et div. in chart. no. xxx. Sig. 1 powder at each of the principal meals.

℞ Salicylate of bismuth,
Alpha-naphthol,
Prepared chalk,
Phosphate of lime, ... āā ʒ iiss.
M. et div. in chart. no. xl. Sig. 1 powder at each of the principal meals.

℞ Lactic acid, ... ʒ iiss.–iv.
Water, ... ℥ vij.
Simple syrup, ... ℥ xxv.
M. Lactic acid lemonade. (Hayem.)

Antidiarrhœic lemonade particularly recommended in choleraic diarrhœa and cholera:

℞ Pure hydrochloric acid, ... ʒ ss.
Resorcin, ... ʒ ss.
Syrup of orange-peel, ... ʒ v.
Water, ... q.s. ad ℥ vi.
M. Sig. A tablespoonful every two to four hours. (Menche.)

For dyspepsia with diarrhœa:

℞ Vinegar of opium,
Bitter drops of Beaumé,[1] . . . . . āā ʒ i.
M. Sig. 4 drops before each meal. (Grasset.)

Treatment of Pain.

Gallard's White Drops:

℞ Hydrochlorate of morphine, ... gr. iss.
Cherry-laurel water, ... ♏lxxv.
M. Sig. 1 or 2 drops on a lump of sugar at the beginning of the meal.

℞ Extract of belladonna,
Powdered belladonna leaves, ... āā gr. iss.
M. et ft. pil. no. x. (Trousseau.)

℞ Hydrochlorate of cocaine, ... gr. iss.
Distilled water, ... ℥ x.
M. Sig. To be taken in tablespoonful doses in the course of two days.

℞ Extract of cannabis indica, ... gr. ⅛–¼.
Alcohol, ... q.s.
Water, ... ℥ v.
M. Sig. To be taken in four or five doses during the twenty-four hours.

℞ Menthol, ... gr. iss.–ij.
Alcohol, ... q.s.
Distilled water, ... ℥ vi.
M. Sig. To be taken in tablespoonful doses. (Bardet.)

℞ Menthol, ... gr. xv.
Alcohol, ... ʒ v.
Simple syrup, ... ℥ i.
M. Sig. A tablespoonful every hour.

℞ Saturated chloroform water, ... ℥ v.
Linden-flower water, ... ℥ iij.
Simple syrup, ... ʒ x.
M. Sig. To be taken in tablespoonful doses.

℞ Nitrate of silver, ... gr. iij.–v.
Distilled water, ... ℥ iij.
M. Sig. 2 teaspoonfuls three times a day. For gastric hyperæsthesia. (Rosenheim.)

[1] See foot-note to Vigier's mixture on page 276.

℞ Powdered opium, ... gr. vi.
Prepared chalk,
Bicarbonate of soda, ... āā ʒ iiss.
M. et div. in chart. no. xx. Sig. 2 or 3 powders at the beginning of a meal.

℞ Powdered opium, ... gr. vi.
Magnesia,
Bicarbonate of soda, ... āā ʒ iiss.
M. et div. in chart. no. xx. Sig. 2 or 3 powders at the beginning of a meal.

Either of the above may be used to combat a slight hyperacidity combined with hyperæsthesia of the gastric mucous membrane.

Chlorodyne (Remington's formula):

℞ Hydrochlorate of morphine, ... gr. xvi.
Water, ... ʒ i.
M. et adde—
Oil of peppermint, ... ♏iv.
Dilute hydrocyanic acid, ... ♏xxiv.
Tincture of capsicum, ... ♏xviij.
Hydrochloric acid, ... ʒ ss.
Tincture of cannabis indica, ... ʒ ij.
Chloroform, ... ʒ iij.
Water, ... ℥ i.
M. Six minims contain $\frac{1}{10}$ grain of morphine.

Laxatives and Purgatives.

Lutz's pills:

℞ Resin of aloes,
Resin of jalap,
Resin of scammony, ... āā gr. xv.
Aqueous solution of caustic soda (29 per cent), . ♏xv.
Glycerin, ... ♏viij.
M. et ft. pil. no. xx. Sig. 1 pill at bedtime.

℞ Extract of belladonna,
Powdered belladonna leaves, ... āā gr. ij.
Podophyllum, ... gr. iv.–vi.
Extract of liquorice, ... q.s.
M. et ft. pil. no. xii. Sig. 1 or 2 pills at night.

℞ Extract of belladonna, ... gr. iij.
Podophyllin, ... gr. viij.
M. et ft. pil. no. xx. Sig. From 1 to 3 pills at bedtime.

℞ Podophyllin, ... gr. ivss.
Powdered ginger, ... gr. iij.
Honey, ... q.s.
M. et ft. pil. no. x. Sig. 1 or 2 pills at night. (C. Paul.)

Purgative draught of the Hôpital Saint-Louis:

℞ Senna leaves,
Viola tricolor, ... āā ʒ ij.
M. Infuse for one hour in two pints of boiling water, strain, and sweeten with honey. Dose: a large glassful in the morning. (Hardy.)

Compound liquorice powder:

℞ Powdered senna leaves,
Sublimed sulphur, ... āā ʒ iss.
Powdered star-anise,
Powdered fennel,
Cream of tartar, ... āā gr. xlv.
Powdered liquorice, ... ʒ ij.
Sugar, ... ʒ vi.
M. et ft. pulv. Sig. From a teaspoonful to a tablespoonful at bedtime.

℞ Magnesia,
Cream of tartar,
Precipitated sulphur, ... āā ℥ ss.
M. et ft. pulv. Sig. A teaspoonful in a quarter of a glass of water once or twice a day at meal-time.

For gastro-intestinal atony with constipation:

℞ Magnesia,
Precipitated sulphur,
Cream of tartar,
Powdered liquorice, ... āā ʒ v.
Powdered ipecac, ... gr. ivss.
M. et ft. pulv. Sig. A teaspoonful in a quarter of a glass of water once or twice a day at meal-time.

Purgative coffee:

℞ Senna, ... ʒ iiss.
Sulphate of magnesia,
Roasted and ground coffee, ... āā ℥ ss.
M. Sig. Infuse in four ounces of boiling water, strain, and sweeten; sufficient for one dose.

Purgative species:

℞ Senna leaves, ... gr. xxx.
Sambucus flowers,
Green anise leaves, ... āā gr. xv.
Fennel,
Bitartrate of potash, ... āā gr. viij.
M. Sig. To make one cup of infusion.

Castor oil:

℞ Castor oil, ... ℥ i.
Gum arabic, ... ʒ ij.
Peppermint water, ... ʒ ix.
Simple syrup, ... ʒ iiss.
Water, ... ℥ ij.
M.

This preparation of the French Codex is often rejected by vomiting.

℞ Saccharate of casein, ... ℥ i.
Castor oil, ... ℥ i.
Water, ... ʒ iiss.
M. ft. emulsio et adde:
Cherry-laurel water, ... ʒ i.
Water, ... ℥ iij.
M. Castor-oil emulsion. (Léger.)

℞ Castor oil,
Orgeat (syrup of almonds),
Syrup of acacia, ... āā ℥ i.
Peppermint water, ... ʒ iiss.
Distilled water, ... q.s. ad ℥ v.

Pour the syrup in a bottle and shake it so as moisten the sides; then pour in the oil and shake well for two or three minutes; add the peppermint water and distilled water. The liquid has the appearance of a white linctus.

Citrate of magnesia lemonade:

℞ Citric acid, ... ℥ i.
Carbonate of magnesia, ... ʒ ivss.
Distilled water, ... ℥ x.
Simple syrup, ... ℥ iij.
Tincture of lemon, ... ♏xv.
M.

"Médecine Blanche" of the French Codex:

℞ Calcined magnesia, ... ʒ ij.
White sugar, ... ℥ iss.
Orange-flower water, ... ʒ v.
Water, ... ʒ x.
M.

NUTRIENT ENEMATA.

℞ Yolk of egg, ... no. i.
Dry peptones, ... 2 dessertspoonfuls.
Laudanum, ... 5 drops.
Bicarbonate of soda, ... 8 grains.
M. For one enema. To be repeated night and morning. (Dujardin-Beaumetz.)

℞ Milk,
Beef tea, ... āā 3 ounces.
Yolk of egg, ... no. i.
Peptones, ... 1 teaspoonful.
Rum, ... 1 ounce.
M.

DYSENTERY.

℞ Powdered ipecac, ... ʒ i.
Boil for five minutes in
Water, ... ℥ iij.
Filter and add
Syrup of opium,[1]
Cinnamon water, ... āā ℥ i.
M. Sig. Tablespoonful doses every hour. (Delioux de Salignac.)

Segond's Pills:

℞ Powdered ipecac, ... gr. vi.
Calomel, ... gr. iij.
Extract of opium, ... gr. i.
Syrup of buckthorn, ... q.s.
M. et ft. pil. no. vi.

Sublimate enema:

℞ Corrosive sublimate, ... gr. ij.-iij.
Water, ... Oi.
Alcohol, ... q.s.
M. Sig. For two injections, one in the morning and one in the evening. (Bonamy.)

[1] A solution of one grain of extract of opium in one ounce of syrup.

Enema for muco-membranous enteritis:

℞ Subnitrate of bismuth,
Salicylate of bismuth, ... āā ʒ iiss.
Mucilage of quince seeds, ... Oi.
M. Sig. For rectal injection. (Revilliod.)

Intestinal Parasites.

Tape-worm:

℞ Ethereal extract of male fern, ... ʒ iiss.
Calomel, ... gr. xv.
M. et div. in capsulas no. xx. Dose: 12 to 16 capsules. (Créquy.)

℞ Fresh bark of pomegranate root, ... ℥ ij.
Water, ... Oiss.
Macerate for twenty-four hours, and then evaporate to one pint.

℞ Pounded bark of pomegranate root, ... ℥ iiss.
Boiling water, ... 1 glassful.
Evaporate to one-half over a gentle fire; filter and pour another glass of boiling water on the residue; evaporate again one-half on a slow fire, filter, and mix the two. (Soulier.)

INDEX.

ABDOMEN, inspection of, 2
palpation of, 3
support of, in neuro-motor dyspepsia, 95, 103, 125, 127
Acid medication, prescriptions, 277
Acidity of urine, 26
Alcohol, influence of, upon digestion, 57
in dyspepsia, 58
Ankylostoma duodenale, 272
ethereal extract of male fern in treatment of, 293
Antisepsis, gastro-intestinal, 207
gastric, 210
intestinal, 212
of stomach in dilatation, 139
Appendicitis, 254
aim of operative interference, 257
former treatment of, 255
laparatomy in, 256
parietal, 255
perforative, 255
Appendicular colic, 255, 256
cause of, 256
treatment of, 256
Appetite,
arsenic to improve, 160
appetizers, 160
bitters, 159
bulimia, 159
climatotherapy, 159
diminished, 159
disorders of, 159
Appetite,
hydrotherapy, 159
orexine hydrochloride, 160
massage, 159
stomach tube, 160
treatment of disorders of, 159
Ascarides lumbricoides, 272
Levant worm seed in treatment of, 272
Aspiration of stomach, 11
Asthenic dyspepsia, 88
Atonic dyspepsia, 88
dilatation of stomach, 129
Auto-intoxication, gastric and intestinal, 207, 214
treatment of, 207
milk diet in, 208
vegetable diet in, 209
dietary for, 209

BEVERAGES in dyspepsia, 57
alcohol, 57
beer, 59
hot drinks, 60
table waters, 59
wine, 59
Bile in fæces, 33
Blood in fæces, 35
Bouveret's treatment of hyperchlorhydria, 84
Bulimia, 159

CANCER of intestine, 265
castor oil in, 265
intestinal antisepsis in, 265

Cancer of intestine, milk diet in, 265
saline purgatives in, 265
surgical intervention in, 265
treatment of pain in, 265
Cancer of stomach, 243
anorexia in, 244
condurango in, 243
in dilatation of stomach, 138
diminution of hydrochloric acid in, 244
gastro-enterostomy in, 246
gastrorrhagia in, 246
mechanism of vomiting in, 246
milk diet in, 243
opiates for pain of, 246
pain in, 246
rectal alimentation in, 245
surgical treatment of, 246
treatment of gastric fermentation in, 245
Catarrhal gastritis, 89
Charcot's classification of symptoms of locomotor ataxia, 146
Chemical dyspepsia, management of, in dilatation, 140
examination of contents of stomach, 13
study of gastric digestion, 7
Chlorides in urine, 28
Climatotherapy, in disorders of appetite, 159
in nervo-motor dyspepsia, 95, 100
Colon, examination of, 6
Minkowski's method, 7
Simon's method, 7
Von Ziemssen's method, 6
Constipation, 161
absence of secretion of intestinal juices due to, 161
of alimentary origin, 161
aloes in, 177
Anderson's pills in, 177
in the aged, 180
Constipation, belladonna in, 175
cascara in, 175
castor oil in, 178
causes of, 162, 163
cause of dyspepsia, 162
in children, 179
complications of, 164, 181
degrees and clinical forms of, 163
diet for, 165, 166
diminution of muscular contractility due to, 161
in dilatation of stomach, 141
Dujardin-Beaumetz's classification of, 161
electricity in, 170
in enteroptosis and obesity, 180
faulty hygiene, due to, 178
in gastro-intestinal dyspepsia, 179
Germain Sée's powder in, 174
gymnastics in, 167
hemorrhoids complicating, 187
hydrotherapy in, 167
hygienic treatment of, 165
injections in, 167
laxatives in, 171
laxative powder of Mathieu, 174
Lutz's pill, 177
magnesia in, 172
manna in, 176
massage in, 167
muco-membranous enteritis complicating, 182
pilulæ ante-cibum, 177
podophyllin in, 194
rectum, disordered sensibility of as cause, 161
rhamnus frangula in, 175
rhubarb in, 175
scammony in, 177

Constipation, senna in, 176
suppositories in, 169
tamarinds in, 175
treatment of, 164
Cures, 56
grape, 56
whey, 57

DEBOVE'S tube, 9
Detritus, alimentary, in fæces, 32
Diagnostic technique, 1
Diarrhœa, 192
acetate of lead in, 202
astringents in, 199
Bouchardat's substitute for diascordium in, 199
bismuth subnitrate in, 200
catechu in, 202
definition of, 192
diascordium in, 198
diet in, 196
etiology, 192
inert powders in, 199
morning, 205
nervous, 204
opium and morphine in, 198
oxide of zinc in, 201
peristaltic sedatives in, 198
prepared chalk in, 201
restoration of lost fluid to organisms in, 202
rhatany in, 202
talc in, 201
tannin in, 201
treatment of, 196
uræmic, 204
venous transfusion in, 203
Diet in auto-intoxication, 208
in constipation, 165, 166
in dilatation of stomach, 138
in dyspepsia, 39
in dyspepsia, nervo-motor, 95
Gautier's table of, 38
Diet, general considerations on, 38
in hyperchlorhydria, 81, 84
milk, 208
vegetable, 209
Dietary for dyspepsia, Leube's, 41
vegetarian, of Dujardin-Beaumetz, 55
Dilatation of stomach, 69
antisepsis of stomach in, 139
atonic, temporary or permanent, 129
cancer in, 138
constipation in, 141
diagnosis of, 132
diet in, 136
gastro-enterostomy in, 139
hydrochloric acid in, 140
with hypersecretion, 129
management of chemical dyspepsia in, 140
mechanical, 129
prognosis of, 134
stasis with, 128
surgical intervention in, 138
symptoms of, 130
treatment of, 136
Diseases of stomach and intestine, classification of, 228
Duodenum, ulcer of, 236
Dujardin-Beaumetz's classification of varieties of constipation, 161
Dysentery, 251
ailanthus glandulosa in, 252
antiseptic enemata in, 252
astringent enemata in, 252
calomel in, 252
ipecac in, 252
milk diet in, 253
prescriptions, 283
purgatives in, 251
Dyspepsia, 221
atonic, 88
asthenic, 88

Dyspepsia, divisions of, 62
flatulent, 89
nervo-motor, 88
nervous, 221
relation with gastritis, 229
treatment of, 62, 223

ELECTRICITY in constipation, 170
in gastric crises, 153
in nervo-motor dyspepsia, 95, 101
in vomiting, 158
Enemata, nutrient prescriptions, 283
Enteralgia, 143
Enteritis, 248
location of seat of inflammation, 248
Enteritis, acute, 249
antisepsis in, 249
bismuth subnitrate in, 249
diet in, 249
opium in, 249
prepared chalk in, 249
salicin purge in, 249
treatment of, 249
treatment of pain in, 249
Enteritis, chronic, 249
chronic diarrhœa of malarial origin, 250
chronic diarrhœa of warm countries, 250
Enteritis, chronic ulcerative, 250
diarrhœa in, 250
diet in, 250
enemata and lavage in, 250
nitrate of silver in, 250
Enteroclysis, 213
Enteroptosis, 124
Ethyl-green in examination of gastric juice, 16
Ewald's method of expression, 12
Ewald and Siewers' method for estimation of gastric motility, 24
Excito-motor medication in nervo-motor dyspepsia, 104
Excreta, study of, 24
Expression of contents of stomach, 12
External examination, 2

FAT in the fæces, 31
examination of, 31
Fancher's tube, 9
Fæces, alimentary detritus in, 32
bile in, 33
blood in, 35
chemical examination of fat in, 31
fat in, 30
mucus in, 33
pus in, 36
starch in, 32
study of, 25, 30
Fermentation of food outside of body, 207
Food powders, 52
of meat, 52
of starchy foods, 54
Frémont's tube, 9

GASTRALGIA, 143, 155
Gastric antisepsis, 210
borax in, 212
boric acid, 212, 219
chlorate of potash, 212
chlorate of soda, 212
chloride of sodium, 212
creolin, 212
hydrochloric acid, 212
hyposulphite of soda, 212
lactic acid, 212, 219
lavage, 219
mechanical, 211
permanganate of potash, 212
resorcin, 212

Gastric antisepsis.
salicylic acid, 212
thymol, 212
Vichy water, 212
Gastric atony, with constipation, prescriptions, 276
Gastric crises, 142
antipyrin in, 152
baths in, 153
belladonna in, 149
bromides in, 153
cannabis indica in, 151
chlorodyne in, 151
chloroform water in, 150
cocaine in, 150
condurango in, 152
counter-irritation in, 154
electricity in, 153
ether in, 152
hot applications in, 153
of locomotor ataxia, Charcot's classification, 146
menthol in, 152
morphine in, 148
nitrate of silver in, 152
opium in, 147
solanine in, 151
sulphide of carbon in, 150
symptoms of, 145
Gastric digestion, chemical study of, 7
Gastric hyperæsthenia, 67
Gastric and intestinal hemorrhage, 226
Gastric juice, examination of, 7, 14
acidity of, 14
qualitative examination of, 15
Gastric motility, 23
estimation of, 23
Ewald and Siewers' method, 24
Klemperer's method for estimation of, 23
Leube's method, 24
Gastritis, acute, 229, 230
alkalies in, 231
hypodermoclysis in, 231
ice in, 231
milk diet in, 231
morphine in, 231
relations with dyspepsia, 229
toxic, 230
treatment of, 231
Gastritis, atrophic, 233
cause of pernicious anæmia, 233
Gastritis, chronic, 232
alkalies in, 233
catarrhal, 89, 232
with excessive secretion of hydrochloric acid, 233
with hypersecretion of mucus, 232
lavage in, 233
Gastritis, ulcerative, 234
Gastritis, with submucous hypertrophic sclerosis, 233
Gastro-enterostomy in dilatation of stomach, 139
as palliative measure in cancer of stomach, 246
Gastro-intestinal antisepsis, 207, 210
antiseptics, 211, 220
dietary, 209
milk diet, 208
mechanical, 211
prescriptions, 277
vegetable diet, 209
Gastro-intestinal atony in hyperchlorhydria, 86
Gastro-intestinal diseases, treatment of, 62
Gautier's diet table, 38
method for determination of organic acids in gastric juice, 21
Gavage, 12
in diminished appetite, 160

Gavage in treatment of vomiting, 158
Germain-Sée's powder in constipation, 174
Gouttes amères de Baumé, 159
Grape cure, 56
Günzberg's test in examination of gastric juice, 16
Gymnastics,
in constipation, 167
in nervo-motor dyspepsia, 100

HAYEM on nervo-motor dyspepsia, 90
Hayem and Winter's method of study of gastric juice, 7
Hemorrhage, gastric and intestinal, 226
anæmia resulting from, 227
ergot in, 226
ice-bag in, 226
opium in, 226
perchloride of iron in, 226
Rabel water in, 226
rest in, 226
transfusion after, 227
treatment of, 226
Hemorrhoids,
hemorrhage from, 190
pain, relief of, 190
symptoms of, 187
treatment of, 188
Hydrotherapy,
in constipation, 167
in disorders of appetite, 159
in nervo-motor dyspepsia, 95, 101
Hydrochloric acid in gastric juice, 66
normal and abnormal amount, 67
Hyperchlorhydria, 66
antacid medication in, 75, 79
atropine in, 81
Hyperchlorhydria, Bouveret's treatment of, 84
Carlsbad water in, 81
calcium salts in, 78
causes of, direct, 72
causes of, indirect, 73
continuous, 68
diagnosis of, 70
diet in, 81, 84
gastro-intestinal atony in, 86
nature of, 69
nitrogenous food in, 82
pains, treatment of, 87
potassium salts in, 78
prescriptions for, 275
simple, 67
sodium salts in, 77
treatment of, 71
varieties of, 66
vegetarian diet in, 82
Vichy and Vals in, 80
Hyperpepsia, 66
Hypersecretion with hyperchlorhydria and permanent stasis, 129

INDICAN in urine, 29
Indigestion, acute, 221
alkalies in, 224
antiseptics in, 225
chloroform water in, 224
diet in, 224
elimination of toxines in, 225
hydrochloric acid in, 224
lactic acid in, 224
lavage in, 224
milk diet in, 224
purgatives in, 224
subacute, 222
treatment, 223
Indol in urine, 29
Injections for constipation, 168
with emollients, 168
glycerin, 168
honey, 168

Injections for constipation, with miel de mercuriale, 168
oil, 169
sea salt, 168
sulphate of soda, 169
Inspection of abdomen, 2
Internal examination of stomach, 7
Intestine, cancer of, 265
examination of, 6
and stomach, diseases of, 228
Intestinal antisepsis, 212
ascending douches, 212
benzonaphthol, 218
beta-naphthol, 215, 217
betol, 216
bismuth salicylate, 215, 216
black sulphide of mercury, 216
calomel, 212
charcoal, 217
eucalyptol, 216
lavage, 212
magnesia salicylate, 216
naphthalin, 216
purgatives, 212
resorcin, 218
salol, 216
Intestinal crises of locomotor ataxia, 147
Intestinal occlusion, 259
capillary puncture in, 261
castor oil in, 261
causes, 259
causes external to intestine, 259
diagnosis of, 260
electricity in, 261, 262
enteroclysis in, 262
hyperodermic injections in, 263
invagination and intussusception as causes of, 259
lavage of stomach in, 264
massage in, 261
morphine in, 261, 263
Intestinal occlusion, obstruction of lumen as causes, 259
occlusion by lesions of walls as causes, 259
precautions in treatment of, 260
pseudo-strangulation as cause, 259
purgatives in, 261
purgative enemata in, 262
rectal injections in, 261
strangulation as cause, 259
Intestinal pains, 155
Intestinal parasites, 267
ankylostoma duodenale, 272
ascarides lumbricoides, 272
oxyures vermiculares, 272
prescriptions for, 284
tape worm, 267

KLEMPERER'S method for estimation of gastric motility, 23
Kussmaul, tornina nervosa of, 144

LAVAGE of stomach, 12
for vomiting, 158
Laxatives, 171
powder of Matthieu, 174
prescriptions, 280
Leube's dietary in dyspepsia, 41
Leube-Rosenthal meat solution, 41
Leube's method for determination of gastric motility, 24

MASSAGE in constipation, 167
in disorders of appetite, 159
in nervo-motor dyspepsia, 95, 101
Matthieu and Rémond's method of measuring amount of fluid in stomach, 15

Meat in dietary for dyspeptics, 44
cooked, 45
extracts, 46
peptones, 46
raw, 44
solutions, 46
Methyl-violet in examination of gastric juice, 16
Mechanical dilatation of stomach, 129
symptoms of, 130
Milk in dietary for dyspeptics, 47
condensed, 51
koumyss, 51
kephir, 52
powders, 51
quantity of, 47
varieties of, 47
Milk diet, 208
sterilized, 209
Movable kidney, 125
Muco-membranous enteritis in constipation, 182
Mucus in fæces, 33

NERVO-MOTOR dyspepsia, 88
acid medication in, 112
alcohol in, 109, 110
alkalies in, 108
bitters in, 105, 106
bread in, 98
causes of, 93
change of scene in, 96
chloride of sodium in, 109, 110, 111
climatotherapy in, 95, 100
creosote in, 109
digestive ferments, 116
diet in, 95
drinks in, 97
electrization in, 95, 102
enteroptosis as cause of, 124
excito-motor medication in, 104
Nervo-motor dyspepsia, excito-secretory medication in, 107
gymnastics in, 100
hydrochloric acid in, 112
hydrotherapy in, 95, 101
ice in, 98
iodine in, 109
iodides and bromides in, 109
ipecac in, 105
kephir in, 109, 111
massage in, 95, 101
mechanical support of abdomen in, 95, 103
milk in, 98
movable kidney a cause of, 125
pancreatin in, 116
pepsin in, 116
pepsinogenous substances in, 120
Rabelizéd sulpho-nitric acid in, 115
résumé of treatment of, 121
salol in, 105
severe forms of, 122
symptoms of, 90
sulphate of sodium in, 109, 110, 111
Nitrogen, amount contained in excreta, 25
Nutrient enemata, prescriptions, 283

ORGANIC acids, determination of, 21
Gautier's method, 21
Oxyures vermiculares, 272
enemata in treatment of, 272
suppositories in treatment of, 272

PAIN, prescriptions, 279
Pains symptomatic of dyspepsia, 154
intestinal, 155

Painful phenomena in diseases of stomach and intestine, treatment of, 142
Palpation of abdomen, 3
Paracresol in urine, 29
Parietal appendicitis, 256
  treatment of, 256
Pepsinogenous medication, prescriptions, 277
Percussion of stomach, 3
Perforation of stomach, 241
Perityphlitis, 254
Phenol in urine, 29
Phosphates in urine, 28
Pilulæ ante cibum for constipation, 177
  Anderson's, 177
  Lutz's, 177
Powders, food, 52
  meat, 52
  preparation of meat, 52
  starchy, 54
Prescriptions, 275
  acid medication, 277
  dysentery, 283
  gastric atony with constipation, 276
  gastro-intestinal antisepsis, 277
  hyperchlorhydria, 275
  intestinal parasites, 284
  laxatives, 280
  nutrient enemata, 283
  pain, 279
  pepsinogenous medication, 277
  purgatives, 280
  round ulcer, 275
  stimulating medication, 275
Purgatives, prescriptions, 280
Pus in fæces, 36
Pylorus, lesions of, causation of dilatation of stomach, 129

QUALITATIVE examination of gastric juice, 15

RABEL water, 226
Reichmann's disease, 68
Rémond and Debove on nervo-motor dyspepsia, 90
Rémond and Matthieu's method of measuring amount of fluid in stomach, 15
Revalescière, 54
Rivière's potion, 157
Round ulcer, prescriptions, 275

SIEWERS and Ewald's method for determination of gastric motility, 24
Simon's method of exploring colon, 7
Simple ulcer and ulcerative gastritis, 234
  difference between, 234
Starch in fæces, 32
Starchy powders, 54
Stomach,
  cancer of, 243
  dilatation of, 128
  and intestine, diseases of, 228
  inflammations of, 229
  lesion of walls of, 129
  percussion of, 3
  perforation of, 241
  succussion of, 4
Stimulating medication, prescriptions, 295
Succussion of stomach, 4
  digital, 4
  total, 4
  Hippocratic, 4, 5
Sulphuretted hydrogen in urine, 28
Sulpho-acids in urine, 28
Surgical intervention in dilatation of stomach, 138

TAPE-WORM, 267
  Corsican moss in, 271
  general principles of treatment, 267

Tape-worm, kousso in, 271
male fern in, 269
pomegranate root in, 270
pumpkin seeds in, 271
sources of, 267
varieties of, 267
Technique, diagnostic, 1
Tormina nervosa of Kussmaul, 144
Toxic substances in urine, 28
Treatment of dyspepsia and gastro-intestinal disease, 62
Tube, Debove's, 9
Faucher's, 9
Frémont's, 9
introduction of, 10
Typhlitis, 254
secondary, 257

UFFELMANN'S reagent in examination of gastric juice, 16
Ulcer of stomach, 234
abstinence from food in, 236
alkalies in, 239
complications of, 241
cicatricial narrowing of pylorus with, 242
difference between, and ulcerative gastritis, 234
food powders in, 238
hydrocyanic acid for vomiting in, 241
milk diet in, 236, 237
nitrate of silver for vomiting in, 241
pain in, 240
peptic ulcer, 236
perforation, 241
rectal alimentation in, 237
subcutaneous injections in, 237
symptoms of, 235
tincture of iodine in, 241
Ulcer of stomach, treatment of, 236
treatment of pain in, 240
ulcer of duodenum, 236
vomiting in, 240
Ulcer, round, prescriptions, 275
Urea in urine, 27
Urine,
acidity of, 26
chlorides in, 28
phosphates in, 28
quantity of, 26
study of, 26
toxic substances in, 28
urea in, 27

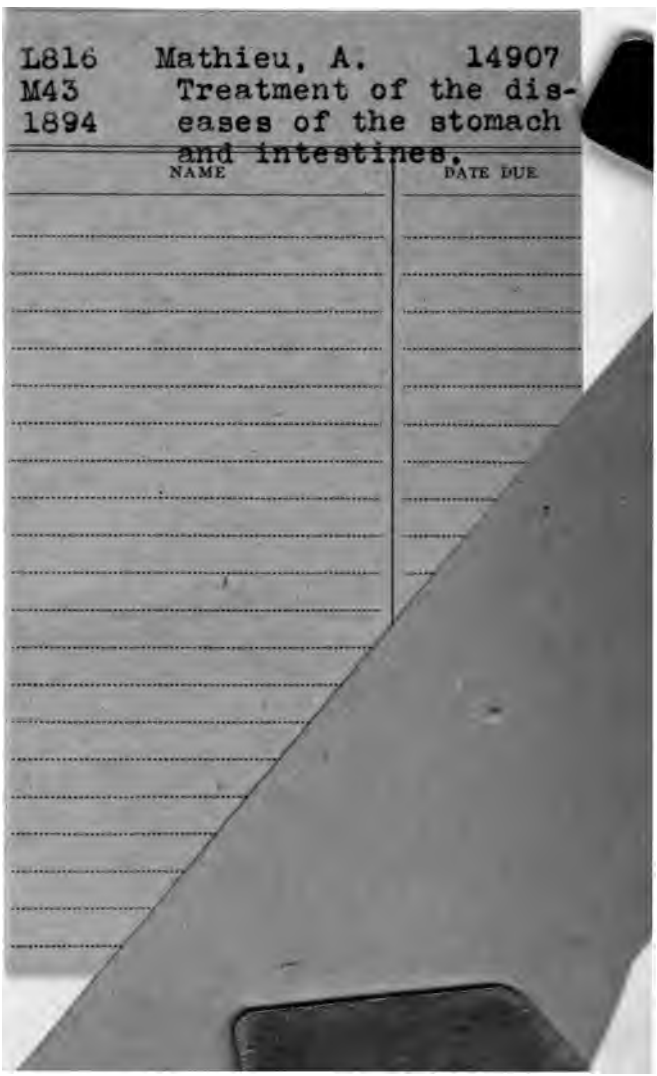
VAN NOORDEN'S experiments in study of excreta, 25
Vegetarian dietary of Dujardin-Beaumetz, 55
Vomiting,
cannabis indica in, 157
chloroform water, 157
cocaine, 157
cold drinks, 157
counter-irritation, 158
electricity, 158
forced feeding, 158
ice, 157
lavage, 158
menthol, 158
morphine, 157
Rivière's potion, 157
tincture of iodine, 158

WHEY cure, 57
Winter and Hayem's method of study of gastric juice, 7
Winter's method of examination of gastric juice, 18

ZIEMSSEN'S, VON, method of exploring colon, 6

LANE MEDICAL LIBRARY

To avoid fine, this book should be returned on or before the date last stamped below.


L816
M43
1894
Mathieu, A. 14907
Treatment of the diseases of the stomach and intestines.
NAME
DATE DUE